STANDARD OPERATING PROCEDURE FOR IMPLEMENTATION OF MOJS GUIDELINES AND AMENDMENTS THEREOF

(Version 9.1)

Central Ground Water Authority
Jamnagar House, New Delhi
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation

May, 2023

Ministry of Jal Shakti

Department of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Authority
Notification of Guidelines dated 24th September 2020
& Amendments dated 29th March 2023

Standard Operating Procedure for Implementation of Guidelines

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Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Authority
Notification of Guidelines dated 24th September 2020

Standard Operating Procedure (SOP)

Executive Summary

Revised guidelines 2020 have been notified in the Gazette of India vide No. CG-DL-E-24092020-221952 New Delhi, 24.09.2020 for obtaining/renewal of No Objection Certificate (NOC) to regulate and control groundwater extraction in the country in supersession of all the earlier guidelines issued by Central Ground Water Authority, Ministry of Jal Shakti. Recently, amendment to guidelines have been notified vide SO 1509(E), dated 29.03.2023.

In order to overcome the difficulties faced by applicants as well as evaluating officers for processing/ issuance of No Objection Certificate (NOC) for groundwater extraction/de-watering in the country, the Standard Operating Procedures (SOP) has been prepared. The SOP will act as a guiding document for workflow and fast tracking the process of issuance of NOC.

Various chapters given in present SoP describe the details about the procedures for processing the applications, eligibility, timeline, various charges and checklist of mandatory documents required for existing/ fresh and renewal applications. Moreover, in the SoP an attempt has also been made to elaborate the procedure to be adopted for imposition of Environmental Compensation and Penalty for illegal withdrawal of groundwater.

WHAT IS NEW

A) Guidelines Amendments dated 29.03.2023

Please go through guidelines amendment dated vide SO 1509(E), 29.03.23023

B) Option for Revival of Rejected Application - Please refer to Public Notice dated 13.10.2022 and corrigendum thereof dated 03.11.2022 (**Annexure-1**).

C) Online Modification Request Facility (Application/ NOC) presently for expansion of industries (quantum increase)

D) Date of Validity for Different Type of Applications (Fresh New, Fresh Existing, Renewal)

- Fresh New (Proposed) Project – Validity starts from Date of issuance of NOC
- Fresh Existing Project – Validity starts from date of submission of application (to be extended in case of very old application where validity may end within next 6 months).
- Renewal Applications – Month and Date remains same as previous NOC, only year will change (presently in practice)

About Accreditation Institutes:

Sl No	Accreditation Institute	Location	For Institution/ Individuals	Authorized for Accreditation From
1	RAJIV GANDHI NATIONAL GROUND WATER TRAINING AND RESEARCH INSTITUTE (RGNGWTRI)	RAIPUR	● Individual consultants ● Institutions	15/2/2021
2	NATIONAL ACCREDITATION BOARD FOR EDUCATION AND TRAINING (NABET)	NEW DELHI	● Institutions only	23/06/2021

Frequently Asked Questions

FREQUENTLY ASKED QUESTIONS	
Q1.	***Who should obtain No Objection Certificate (NOC) from CGWA?***
Ans.	*All Residential Apartments (with or without Swimming Pools, except exempted under Para 1.0(vii))/ Group Housing Societies (with or without Swimming Pools, except exempted under Para 1.0(vii))/ Government Water Supply Agencies in Urban Areas / Industrial / Infrastructural / Mining Projects which are either existing, new or are under expansion and requiring to withdraw ground water have to obtain NOC from CGWA.*
Q2.	***Who is exempted from seeking No Objection Certificate (NOC)?***
Ans.	*Following categories of consumers shall be exempted from seeking NOC for ground water extraction :* *(i) Individual domestic consumers in both rural and urban areas for drinking water and domestic uses.* *(ii) Rural drinking water supply schemes.* *(iii) Armed Forces Establishments and Central Armed Police Forces establishments in both rural and urban areas.* *(iv) Agricultural activities.* *(v) Micro and small Enterprises drawing ground water less than 10 cum/day.* *(vi) All industries/ mining projects/ infrastructure projects drawing ground water* ***only*** *for* ***drinking/ domestic*** *purposes* ***up to 5 cum/ day in all assessment units****.* *(vii) Residential Apartments and Group Housing Societies:* ***a)*** *For drinking and domestic uses, drawing ground water up to 20m3/day, subject to conditions mentioned in Para 2.0 of the guidelines.* ***b)*** *Dwelling units for Economically Weaker Sections* ***(EWS)*** *under* ***Government schemes***
Q3.	***Which type of industries shall not be granted No Objection Certificate (NOC)?***
Ans.	*New industry and expansion of existing industries except those falling under MSME category (other than PDWs) located in over-exploited assessment units involving increase in quantum of ground water shall not be granted NOC.*
Q4.	***Will new projects falling under Over-exploited assessment units be required to apply for NOC from competent authority?***
Ans.	*Only new industries falling under MSME (other than PDWs) can apply for NOC for ground water abstraction in OE assessment units. New industries falling in other categories can obtain NOC only for drinking/domestic use for work force and greenbelt development. Further New mining Projects and New Infrastructure*

	Projects can apply for NOC in OE areas.
Q5.	***Is expansion of existing industries falling under over-exploited assessment units involving increase in quantum of groundwater abstraction allowed?***
Ans.	*Expansion of existing industries involving increase in quantum of ground water withdrawal falling under Over-exploited assessment units is permitted only for MSME sector.*

Q6.	***Are new packaged water industries falling under MSME category and located in Over-exploited assessment areas eligible to apply for NOC?***
Ans.	*No.*
Q7.	***Which type of infrastructure projects is not eligible for seeking No Objection Certificate (NOC) in OE Areas?***
Ans.	*Except **following 7 categories**, **no infrastructure project is eligible** for NOC in **OE areas**.* *(i) Special Economic Zone* *(ii) Metro Stations/ Railway Stations/ Bus Depots* *(iii) Airport, Seaport, Logistics, Cargo & Warehouse* *(iv) Highway Infrastructiure* *(v) Fire Station* *(vi) Hospitals & Nursing Homes* *(vii) Educational Institutions including schools, colleges, universities, coaching institutes, training centres/ skill development centres*
Q8.	***In which States / UTs CGWA is issuing NOC for ground water withdrawal to Residential Apartments / Group Housing Societies / Government Water Supply Agencies in Urban Areas / Industrial / Infrastructural / Mining Projects/ Bulk Water Supply for Drinking, Doemstic purposes?***
Ans.	*In the States of Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Rajasthan, Sikkim, Tripura, Uttarakhand, and in UTs of Andaman & Nicobar, and Daman, Diu & Dadra Nagar Haveli.*
Q9.	***In which States / UTs CGWA is not Issuing NOC for ground water withdrawal to Residential Apartments / Group Housing Societies / Government Water Supply Agencies in Urban Areas / Industrial / Infrastructural / Mining Projects?***
Ans.	*CGWA does not Issue NOC for ground water withdrawal in the States of Andhra Pradesh, NCT Delhi, Uttar Pradesh, Punjab, Haryana, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Tamil Nadu, Telangana and West Bengal and in UTs of Chandigarh, Puducherry, Lakshadweep and Ladakh.*
Q10.	***Where should project proponent submit the Proposal?***

Ans.	*Project proponent has to submit the application online on the website http://cgwa-noc.gov.in.*
Q11.	***Is installation of Sewage Treatment Plants (STPs) mandatory for all residential apartments/ Group Housing Societies?***
Ans.	*Installation of Sewage Treatment Plants (STPs) shall be mandatory for all new residential apartments/ Group Housing Societies where ground water requirement is more than 20 m^3/day.*
Q12.	***What are ground water abstraction charges and who need to pay it?***
Ans.	*Ground water abstraction charges are amount to be paid against ground water withdrawal based on type of water use, the quantum of ground water extraction and category of assessment unit.* *All residential apartments/ group housing societies/ Government water supply agencies in urban areas / Industries / Mining/ Infrastructure projects drawing ground water in safe, semi-critical and critical assessment units will have to pay ground water abstraction charges.*
Q13.	***Who need to pay ground water restoration charges?***
Ans.	*All existing Mining / Infrastructure projects / Industries (including MSMEs) and new MSMEs (other than PDWs), new infrastructure (falling in 7 categories in Ans-7) and new mining projects drawing ground water in over-exploited assessment units will have to pay ground water restoration charges based on their quantum of ground water extraction.*
Q14.	***Can treated water be used for recharge to ground water?***
Ans.	*Treated / Untreated wastewater can not be used for recharge to ground water.*
Q15.	***Which type of industries need to submit Impact Assessment Reports?***
Ans.	*All industrial projects extracting / proposing to extract ground water in excess of 100 m^3/day and up to 500 m3/day ground water in over-exploited, critical and semi-critical areas shall have to mandatorily submit Impact Assessment Report with Analytical Modelling Report (Annexure-4a and 4b). For GW Extraction above 500 KLD in OCS blocks shall have to mandatorily submit Impact Assessment Report with Mathematical Modelling Report Also in safe areas underlain by hard rock, industries drawing >500 m^3/day and in safe areas underlain by alluvium/ soft rock, industries drawing >2000 m^3/day are required to submit impact assessment report with Mathematical Modelling (Annexure-4a and 4b)*
Q16.	***What kind of project needs to submit consent / approval from the wetland authorities?***
Ans.	*Projects falling within the 500 m. periphery of demarcated wetland area (As per RAMSAR Sites given in **Annexure-2**) shall mandatorily need to submit consent/ approval from the appropriate wetland authorities/ State Authority/ or any other appropriate local government authority to establish their projects in the area.*

Q17.	***What is the mode of payment of processing fee, abstraction fee and restoration charges?***
Ans.	*One year advance Payment is to be made online through link given in NOCAP Bharatkosh (website: Bharatkosh.gov.in) before submission of application Arrears/ EC/ Penalty, if applicable will be communicated later on approval of application and will have to deposited against the application within stipulated period by logging in into one's account .*
Q18.	***Will it be allowed to apply for renewal after validity expiry of NOC?***
Ans.	*Yes, but the project proponent shall be liable to pay environmental compensation for the period starting from the date of expiry of NOC, till NOC is renewed by the competent authority.*
Q19.	***Is there any provision of extension of NOC?***
Ans.	*Yes, extension of NOC will be allowed in case proponent is unable to construct well(s) during the validity period of NOC.*
Q20.	***How extension of NOC will be accorded and for how many years?***
Ans.	*Proponent will have to apply for extension of NOC with valid reason along with supportive documents. Other conditions will remain the same as that for fresh NOC. Extension of NOC will be granted for the maximum period of 2 years. Creation of facility for online request for extension in NOCAP is in process and will be functional shortly.*
Q21.	***Can CPHEEO norms be considered instead of NBC-2016 norms?***
Ans.	*No. The guidelines of NBC-2016 norms are available on CGWA website.*
Q22.	***Which projects are exempted from paying groundwater abstraction charges?***
Ans.	*The projects which are abstracting saline groundwater are exempted from paying groundwater abstraction charges. However, in case of delay in submission of application, EC will be charged at the rates prescribed for Safe Area.*
Q23.	***Are the projects eligible for any kind of rebate to seek NOC?***
Ans.	*Yes, proponents will be eligible for 50% rebate in groundwater abstraction/groundwater restoration charges, at the time of every renewal by the competent authority, if they have implemented recharge measures as per the condition specified in their previous NOC.*
Q24.	***What will happen in case of nonpayment of EC/ Penalty/ Arrears (if applicable) after approval of NOC?***
Ans.	*If the applicant fails to deposit required charges ~~abstraction/restoration charges~~ within the prescribed time limit, the application shall be liable to rejection (even after approval).*
Q25.	***What is the procedure for change in groundwater quantum in the NOC/***

	Application?
Ans.	*The PP has to apply online thorugh Modification Request Facility on NOCAP with proper justification and supporting documents. The change will subject to approval of competent authority.*
Q26.	***What is the procedure in case of failure of Bharatkosh transactions?***
Ans.	*The project proponent will have to contact Bharatkosh helpline/NTRP Team on email ID available on NTRP portal. No action is required from CGWA side.*
Q27.	***What is the mechanism for imposing EC on illegal abstraction?***
Ans.	*EC is to be imposed for illegal abstraction of ground water.* *The amount of EC will be deposited by applicant online by logging into user account*
Q28.	***What is the mechanism for show cause notice?***
Ans.	*If a firm violates the NOC conditions and it has been proved during site inspection, the show cause notice will be issued to the firm by the NOC approving authority RD/HQ with condition of replying within 15 days. If the firm fails to submit reply within stipulated time frame, the case may be forwarded to respective Authorized DM/DC for necessary action.*

Chapter-1

Application Fee and Processing

1.1 Application Fee

- Fresh NOC Rs. 10000
- Renewal of NOC Rs. 5000
- Extension of NOC Rs. 5000
- Change in User ID Rs. 5000
- Change in name of the firm Rs. 5000
- Issuance of corrigendum of NOC Rs. 5000
- Any other items/ corrections etc.- Expansion of NOC Rs. 5000

1.2 Processing of Applications for Fresh NOC and Renewal of NOC

Applications received in Regional Offices shall be verified, processed and approved and NOC shall be processed and disbursed for ground water abstraction upto 100 KLD and those above 100 KLd will be forwarded to HQs after verification. The detailed procedure for processing of applications and issuance of NOC is described in succeeding paras. NOC shall be issued for the period as per assessment unit category and type of water use as mentioned below:

Category	Use	Validity of NOC
Critical, Semi-critical and Safe	Infrastructure projects for drinking & domestic use and urban Water Supply Agencies	5 years
	Industries	3 years
	Mines	2 years
Over exploited	All users in 'Over-exploited areas'	2 years

1.2.1 Regional Office

Regional Director/ Head of Office is declared as Administrator at Regional Office. All cases up to 100 m^3/day will be processed in the Regional Office.

1.2.1.1 Role of Evaluating Officer

Check all the documents as per the check list given below and enter details of processing fee and ground water abstraction/ restoration charges received at verification stage. Verification is to be completed within 7 days of receipt of application.

CHECK LIST OF DOCUMENTS AT VERIFICATION STAGE

S.No	*Documents*	*Yes/No*
1	Consolidated Consent & Authorization (CCA) *Consent to Establish (CTE) or Consent to Operate (CTO) from State Pollution Control Board or letter from MoEF, or letter from State level Environmental Impact Assessment Authority or any other letter from statutory agencies indicating date of commencement of project (in case of OE area and in case of new projects only)*	
2	*Affidavit on non-judicial stamp paper of Rs. 50/- by the applicant, confirming non/ inadequate availability of public water supply (in case of water requirement is less than 10 KLD for fresh as well as renewal cases)*	
3	*Certificate regarding non/ partial availability of fresh water/ treated waste water supply from the local government water supply agency (Required in case of water requirement is more than 10 KLD for fresh as well as renewal cases)*	
4	*In saline category only, Ground water quality report of existing well from NABL accredited/govt. approved lab*	
5	*Water requirement for drinking and domestic purpose to be computed as per the National building code (NBC) 2016.*	
6	*Completion certificate/Affidavit from the concerned agency for infrastructure projects in case ground water requirement exceeds 10 KLD*	
7	*Certificate of Installation of STP /Affidavit (For New Projects) in case of water requirement is more than 20 KLD*	
8	*Impact Assessment Report/G.W. Modeling report by accredited consultants as per the format available in NOCAP (if applicable)*	
9	*MSME Certificate in case of MSME (If groundwater requirement is more than 10 KLD or more in OE areas) or certificate for Medium Enterprise if groundwater requirement is less than 10 KLD*	
10	*Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas*	
11	*Certificate/Affidavit of wetland from projects falling beyond 500 m from the periphery of demarcated wetland areas* ***only in the districts*** *where the wetland is located (Annexure- showing RAMSAR sites)*	

12	*Water audit reports by certified auditors of agencies approved by CGWA for cases GW withdrawal is more than 100 KLD (in case of renewal Only)*	
13	*Site Inspection/ Self Inspection (Renewal cases only)*	
14	*Approved Mine Plan by approving authority.*	
15	*Comprehensive Hydrogeological report on groundwater conditions in core and buffer zones of the mine . in case of dewatering by Accredited Consultants as per guidelines. GW Modelling report by accredited consultant is to be included in CHR in case of > 500 KLD GW extraction.*	
16	*Copy of Bharatkosh receipts (If payment made directly into Bharatkosh without using NOCAP Link):* ● *Application Fee* ● *Ground water abstraction/ restoration charges*	

- Applications incomplete (partial payment/ non-payment of Abstraction/ Restoration Charges and/ or without mandatory documents **are to be rejected** at verification stage itself. The reason(s) for rejection is/ are to be clearly mentioned in the Action Comment and Noting.
- Application for ground water withdrawal of more than 100 KLD after verification and filling up Evaluation Proforma in the Headquarter will be forwarded to AO level at HQ.
- Applications seeking GW withdrawal upto 100 KLD,if documents are complete, should be processed, else rejected within 7 days of receipt of application. No queries should be made at verification stage.
- In case of complete application, EO shall fill Evaluation Proforma, calculate ground water abstraction/ restoration charges and fill columns regarding EC and penalty, if any and forward to Approving Officer.
- If any query is raised in application processing stage, first query should be raised within 7 days giving 15 days time for submission of response. Query will be generated at EO level and will be approved by AO. Therefore, in case of query application will be forwarded to AO level seeking approval of query.
- Query will be sent by email (till provision of generating query is made in NOCAP portal).
- If response to first query is received and reply is satisfactory, fill Evaluation Proforma, calculate ground water abstraction/ restoration charges and fill columns regarding EC and penalty, if any and forward with recommendation to Approving Officer with noting (Visible to applicant on website and by SMS).
- Second query may be raised in special cases in extraordinary situations only.
- On receipt of satisfactory reply of queries, fill the Evaluation Proforma and calculate groundwater abstraction/ restoration charges and fill columns regarding EC and penalty, if any and forward with

recommendation to Approving Officer with noting. (Visible to Applicant on website and by SMS).

- In case no reply is received even after second query or reply is still **unsatisfactory**, **reject** the application clearly stating the reason.

1.2.1.2 Role of Approving Officer

- Approving Officer will verify the recommendation received from Evaluating Officer and returned for clarification to Evaluating Officer, if any discrepancy is observed.
- Approving officer will also check the ground water abstraction/ restoration charges, EC and penalty calculated by the Evaluating Officer.
- In case of query, if AO is satisfied with the query suggested by EO, he will approve as it is, otherwise he will modify/ add query and return to EO.
- AO will approve the application if quantum of ground water withdrawal is upto 10 KLD on being satisfied with the recommendation of the Evaluating Officer.
- Applications for ground water withdrawal of > 10 KLD will be forwarded to Admin with recommendation and noting in case of higher quantum of ground water withdrawal. Action/ comment is visible to Applicant on website and by SMS.
- There may be provision to representation by the applicant in case of dispute/mismatch in query by himself or authorized representative by means of submitting documents/presentation to resolve query before expiry of time limit. **After both the queries, if applicant fails to satisfy condition, the application will be rejected,** else with satisfactory reply application will be processed for issuance of NOC.

NOC processing

- After approval of NOC from AO/ Administrator, will check and update the charges, EC and penalty, if any, imposed and received from the PP in NOC processing sheet.

NOC disbursement

- After updating of charges, EC and penalty, AO will approve and disburse the NOC.

1.2.1.3 Role of Administrator

- Recommendation received from Approving Officer will be verified and returned to Approving Officer for clarification, if any discrepancy is observed.
- Application upto 100 KLD will be approved by Administrator within cumulative 15 days of receipt of complete application if no query is raised.
- In case of query raised, application is to be approved within 30 days.

1.2.2 HQs Office

Applications for more than 100 KLD will be submitted directly to CGWA, New Delhi. Applications for ground water abstraction of more than 100 KLD after verification will be forwarded to AO level in HQs for further processing.

1.2.2.1 **Role of Evaluation Officer (EO, HQ)**

Please refer to Section 1.2.1.1 above.

1.2.2.2 Role of Approving Officer

- The Approving Officer will process the application. For processing of applications of > 100 KLD in OCS areas and >500 KLD in safe areas underlain by hard rock and > 2000 KLD in safe areas underlain by soft rock/ alluvium and mining/ infrastructure dewatering projects, the AO will go through the Impact Assessment Report, Comprehensive Hydrogeological Report, Modelling Report and the Water Audit Report as the case may be. If the case is fit for review by the Expert Appraisal Committee (EAC), AO will recommend for presentation before EAC. Mail will be sent to PP for sending presentation and filled in evaluation proforma.
- After approval of EAC of such applications, AO will check the charges deposited by the PP, calculate revised charges in case change of quantum is suggested by EAC, calculate EC and penalty, if any, and fill up Evaluation proforma.
- Applications of infrastructure projects not involving dewatering , and therefore, not requiring IAR and review by Expert Appraisal Committee will be processed by AO. AO will check the charges received, calculate EC and penalty and submit with recommendation to the Administrator. AO will fill the Evaluation Proforma.
-

1.2.2.2 Role of Administrator

- On receiving recommendation from the AO, the Administrator will shortlist the cases for presentation before the EAC and arrange to hold meeting of EAC. All the applications approved by the EAC will be processed. Applications upto 500 KLD shall be approved by Administrator and those of higher quantum shall be recommended and forwarded to Member.
- Cases which have not been approved by EAC will be returned to AO for seeking the information as advised by the EAC.
- Cases which do not come under purview of EAC, the Administrator will process and approve applications upto 500 KLD and forward applications of higher quantum to Member.

1.2.2.3 Role of Member

- Member will examine all applications as recommended by the Administrator and approve if the quantum of ground water abstraction is >500 to 1000 KLD and forward applications with quantum of >1000 KLD to Chairman.

1.2.2.4 Role of Chairman

- Chairman will approve all applications for ground water withdrawal of >1000 KLD as recommended by the Member.

NOC processing and disbursement

- After approval of NOC from Administrator/ Member/ Chairman as per quantum, AO will update the charges, EC and penalty imposed and received from the applicant and modify the NOC in case required.
- Approve and disburse the NOC in case all payments have been received. NOC will be automatically uploaded.
- NOC is to be issued within 45 days of submission of application.

1.2.3 Clarifications for NOC processing

1. Existing infrastructure projects where the application has been submitted before 24/9/2020 and water requirement is >20 KLD -- **STP is not mandatory.**

2. Completion certificate/occupancy certificate - It is mandatory document for issuance of NOC for all projects in respect of Infrastructure Projects. **However, an affidavit can be accepted from the project proponents as given in the annexure**.

3. While computing the water abstraction/ restoration charges, the consumption for major use has to be taken for deciding the rates of charges.

4. The Micro and Small enterprises mining, hotel and infrastructure project applicants having GW withdrawal less than 10 KLD are also exempted from seeking NOC.

5. Mining Projects seeking renewal need **not** submit water availability certificate.

6. Mining cases where water requirement is for drinking and domestic purpose shall be dealt under **drinking and domestic category**.

7. Industries applying for the first time **need not submit water audit** report at the time of filing application.

8. As per the amendment to guidelines notified on 29.03.2023, *All projects extracting/proposing to extract ground water in excess of 100 m3 /day in Over-exploited, Critical and Semi-critical areas and in excess of 500 m3/day in areas underlain by non-alluvium and 2000 m3/day in areas underlain by alluvium in Safe assessment units shall have to mandatorily submit impact assessment report and ground water modeling study of existing/ proposed ground water withdrawal on the ground water regime covering 5 KM radius area around the project site prepared by accredited consultants.*. The following will be the criteria for GW modelling.

a. Criteria for Modelling Studies for Industries

Assessment Unit Category	Modelling Method	Area Type	Quantum	Remarks
OCS	Analytical Modelling	HR/ Non-alluvium	>100-500	Refer to SECTION F
		Alluvium	>100-1000	
	Numerical Modelling	HR/ Non-alluvium	>500	
		Alluvium	>1000	
Safe	Numerical Modelling	HR/ Non-alluvium	>500	
		Alluvium	>2000	

b. Criteria for Modelling Studies for Mining projects.

Numerical Modelling for seepage part above 500 KLD.

c. Criteria for Modelling Studies for Infrastructure projects.

Numerical Modelling for all projects involving dewatering irrespective of quantum.

The following amendments have been made and are available on the NOCAP Portal:

(a) The Impact Assessment study Report in case of industries covering 5 Km radius area around the project site and ground water modeling study is mandatory as per the criteria given in point number 8.

(c) In case of infrastructure projects where dewatering is required, impact assessment report along with groundwater modeling in 5 km radius shall be mandatory irrespective of groundwater volume.

(d) All mining projects irrespective of dewatering shall mandatorily submit comprehensive hydrogeological reports of core and buffer zones in the radius of 2 and 10 sq.km respectively.

(e) In case of dewatering, ground water modeling in 10km radius is mandatory as per the criteria given in point number 4 below.

9. For Renewal case: In case of non compliance of conditions of previous NOC, penalty of Rs. 100000 will be imposed under Section 15 of EPA for non compliance in case of NOCs issued/ applications submitted prior to 24.9.2020, since guidelines cannot be implemented with retrospective effect.

However, the applicant need to comply with the then NOC conditions within six months of renewal failing which case will be liable for EC.

10. Existing industries, infrastructure units and mining projects which have installed/constructed artificial recharge structures in compliance of the conditions prescribed in the groundwater guidelines prevailing at the time of grant of No Objection Certificate or its renewal shall be eligible for a rebate of 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, subject to their satisfactory performance and verification in each renewal.

11. Projects existing prior to 30.09.2022, which had not applied for NOC by the last date, I.e 30.09.2022 shall be liable to pay EC as per Public Notice dated 03.11.2022 (**Annexure-3**). **However**, the relaxation in the Public Notice to PPs who made attempts to apply by 30.09.2022 but could not do so due to NOCAP issues, shall not be applicable in respect of such applications submitted after **31.12.2022**.

1.3 Extension of NOC

Cases of extension of NOC shall be approved at appropriate levels as defined in the procedure for processing of NOC applications. **Extension of No Objection Certificate will be granted for a maximum period of two years. No further extension will be granted after the expiry of the extended period.**

1.3.1 Regional Office

1.3.1.1 Role of Evaluating Officer

The Evaluating Officer will first examine the application and attached documents submitted by the Project Proponent.

Check list in case of Extension of NOC

S.No.	Documents	Yes/ No
1.	Previous NOC	
2.	Documentary proof justifying the reasons for delay in implementation of the project	

- Extension of NOC is to be considered only in cases, where no ground water abstraction structures have been constructed.
- If EO is satisfied with the justification furnished by the PP, EO will recommend applications of up to 100 KLD to AO of the Regional Office and applications above 100 KLD will be forwarded to HQ.
- EO will also indicate ground water abstraction/ restoration charges to be deposited by the PP.

- After approval from the approving Authority, charges will be communicated to PP giving 15 days' time to deposit the same.
- After receiving the charges, Extension letter will be issued duly signed by the Regional Director till the provision for online submission and processing is made in NOCAP.

1.3.1.2 Approving Authority at Regional Office

The applications for extension of NOC shall be approved by the approving Authority as specified below:

S. No.	Quantum of ground water abstraction (KLD)	Approving Authority
1.	Upto 10 KLD	Approving Officer
2.	Upto 100 KLD	Administrator

1.3.2 HQs Office

1.3.2.1 Role of Evaluating Officer (EO, HQ)

Pl refer to Section 1.3.1.1 above

1.3.2.2 Role of Approving Officer

- The Approving Officer will examine the application along with supporting documents forwarded by the Evaluating Officer of the Region and the recommendation furnished by the EO.
- Extension of NOC is to be considered only in cases, where no ground water abstraction structures have been constructed.
- If AO is satisfied with the justification furnished by the PP and recommendation of the EO from Regional Office, AO will recommend the application to Administrator.
- AO will also indicate ground water abstraction / restoration charges to be deposited by the PP.
- After approval from the approving Authority, charges will be communicated to PP giving 15 days' time to deposit the same.
- After receiving the charges, Extension letter will be issued duly signed by the Member till the provision for online submission and processing is made in NOCAP.

1.3.2.3 Approving Authority at HQs Office

The applications for **extension** of NOC shall be approved by the approving Authority as specified below:

S. No.	Quantum of ground water abstraction (KLD)	Approving Authority
1.	Up to 500 KLD	Administrator (RD/ HoO)
2.	Up to 1000 KLD	Member
3	>1000 KLD	Chairman

1.4 Change in User ID in NOCAP portal

The user will send mail to the concerned **Regional Office** requesting for change in User ID, indicating the new User ID and submit the following documents:

- ID proof
- Authorisation letter
- Copy of NOC, in case of existing NOC holders.
- In case NOC has not been issued, the user will inform application No.
- Bharatkosh receipt for fee paid for Rs. 5000 (Till the provision for service request is made online in NOCAP portal)

The Evaluating Officer on being satisfied with the documents submitted by the Proponent obtain approval from Regional Director and do the needful in NOCAP.

1.5 Change in name of the firm

The user will submit a request through mail to the concerned Regional Office/CGWA for change of name of the firm along with the following documents:-

- Bharatkosh receipt for fee paid for Rs 5000 in respect of name change
- Certificate of incorporation or any other legal document in support of name change
- Copy of existing NOC

The Evaluating Officer in Regional Office/ AO in HQs office, as the case may be, will check the documents submitted by the proponent and put up for approval. Approving Authority will be as follows:

S. No.	Quantum of ground water abstraction	Approving Authority

	in the NOC/ application (KLD)	
1.	Upto 10	AO in Regional Office
2.	Upto 100	Administrator in Regional Office (RD/HoO)
4.	Upto 500	Administrator in HQs (with the role of rdhq)
5.	Upto 1000	Member
6.	>1000	Chairman

After receiving approval from the Approving Authority EO will change in the name in the NOCAP and issue corrigendum of NOC.

1.6 Issuance of corrigendum of NOC/ Revised NOC

Once a request is received in the Regional Office/ HQs from the applicant regarding issuance of corrigendum/ revision in NOC, the Evaluating Officer in the Region / Approving Officer in the HQs will examine the request and justification furnished by the applicant. If he is satisfied with the justification corrigendum/ revised NOC will be issued after approval of the approving Authority as mentioned in the table under para 1.5.

1.7 Expansion of quantum of ground water abstraction in NOC

Application for expansion of NOC shall be considered separately only if it is submitted within the validity period of NOC. After the expiry of validity of NOC, proposal for expansion is to be included by the applicant in the application for renewal of NOC. Applications upto 100 KLD shall be processed at Regional Office and those above 100 KLD at HQs. **Such requests are to be made by PP online through Modification Request Facility on NOCAP Portal**.

Check list in case of Expansion

S. No.	Documents	Yes/ No
1.	Previous NOC	
2.	Documentary proof justifying the increase in quantum of ground water abstraction - Consent to Operate or Environmental Clearance or any other document by concerned State agency mentioning the increased quantum of water consumption	

3	Self-inspection	
4	Bhratkosh receipt of Rs. 5000	

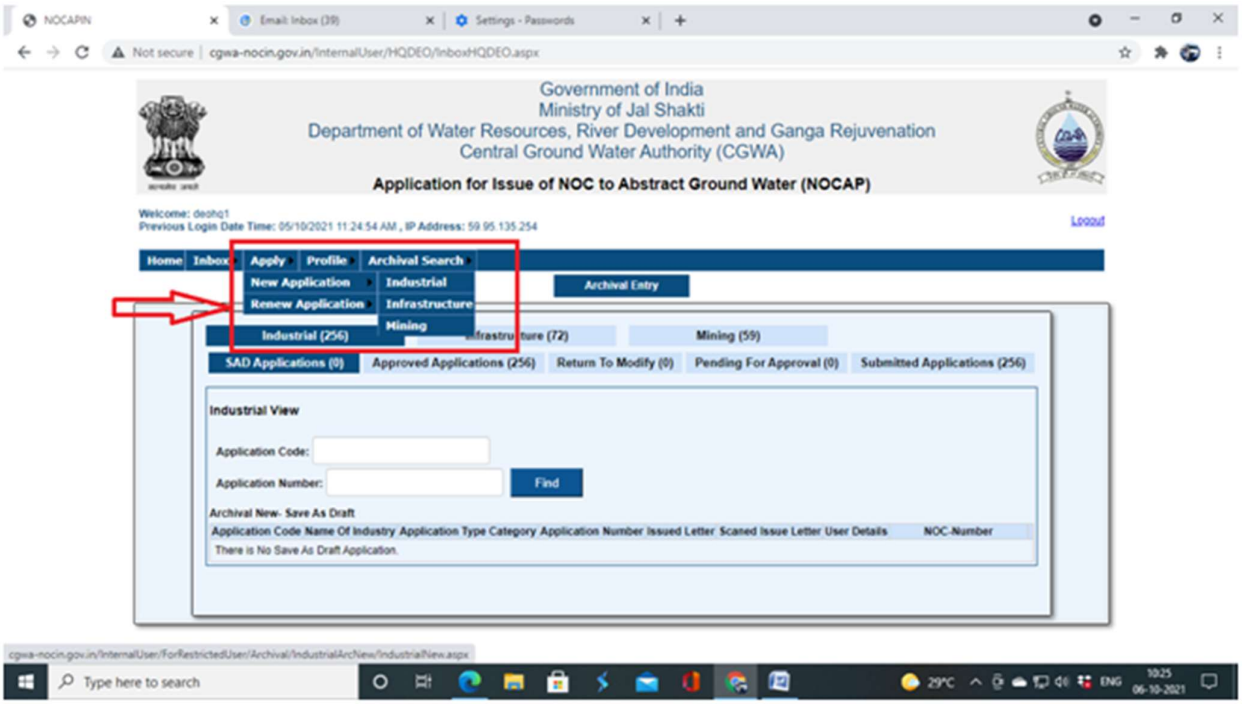
- Application will be submitted by the applicant online **through Modification Request Facility on NOCAP Portal**.
- Procedure for processing of application and issuance of Revised NOC shall be the same as described under application processing for fresh/ renewal of NOC.
- Approving Authority will be the same as for approval of NOC.
- No expansion shall be granted to existing industries in Over-exploited assessment units.
- However, if any industry has already undergone expansion before 24.09.2020, in such case expansion to industry in Over-exploited assessment units shall be considered.

1.8 Archival of old applications and NOC

Archival of old applications received and processed offline is to be done at respective Regional Offices. Steps for archival of applications and NOC are given below:

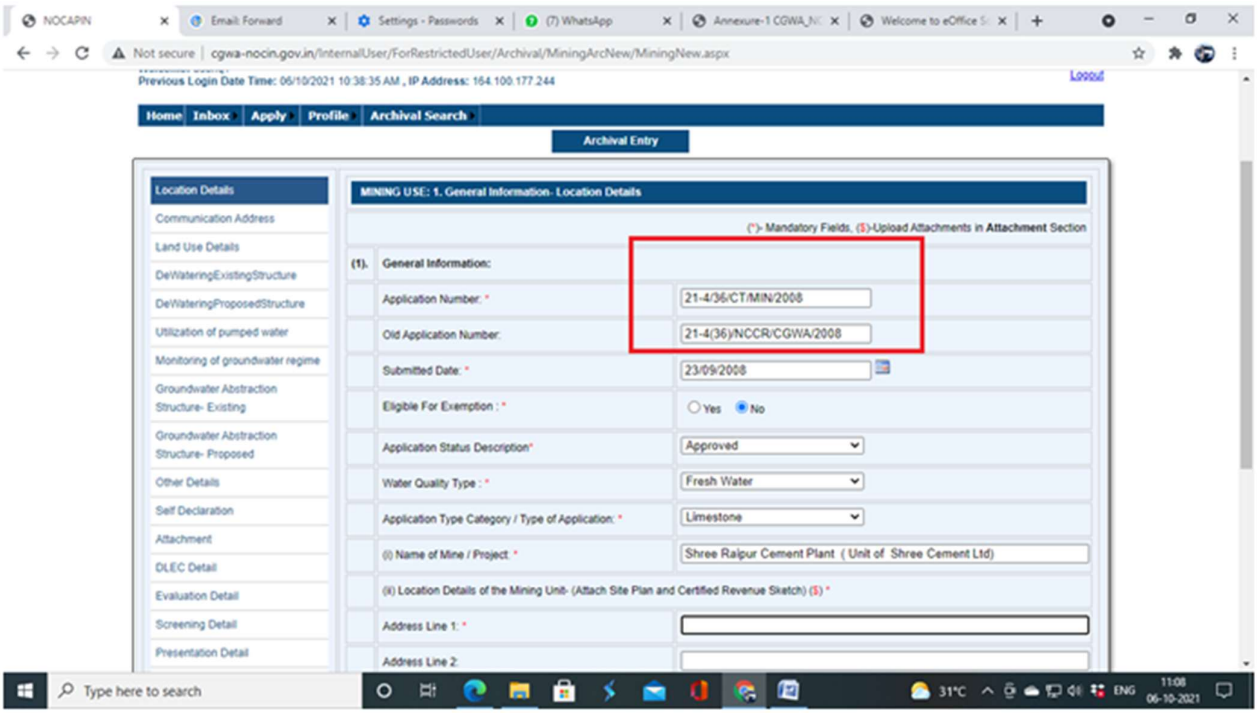
Step- 1 Log in using ID and Password of Data Entry Operator as provided by NIC

Step- 2 Click on **Apply → New application→ Industry/ Infra/ Mining**



Step- 3

Fill the details from the application (Make sure that the new application number is as per format as shown below)



Step-4

Fill all the details as per application and NOC like project address, communication address, quantum of ground water abstraction /dewatering, Number of abstraction and dewatering structures and attach all the documents in extra attachment page.

NOTE : New NOC number should be in proper format as shown below
For fresh NOC- Old NOC number- CGWA/IND/Proj/2018/332

New Format

For fresh NOC - CGWA/NOC/IND/ORIG/2018/332
For 1ST renewal NOC- CGWA/NOC/IND/REN/1/2018/332
For 2nd renewal NOC- CGWA/NOC/IND/REN/2/2018/332

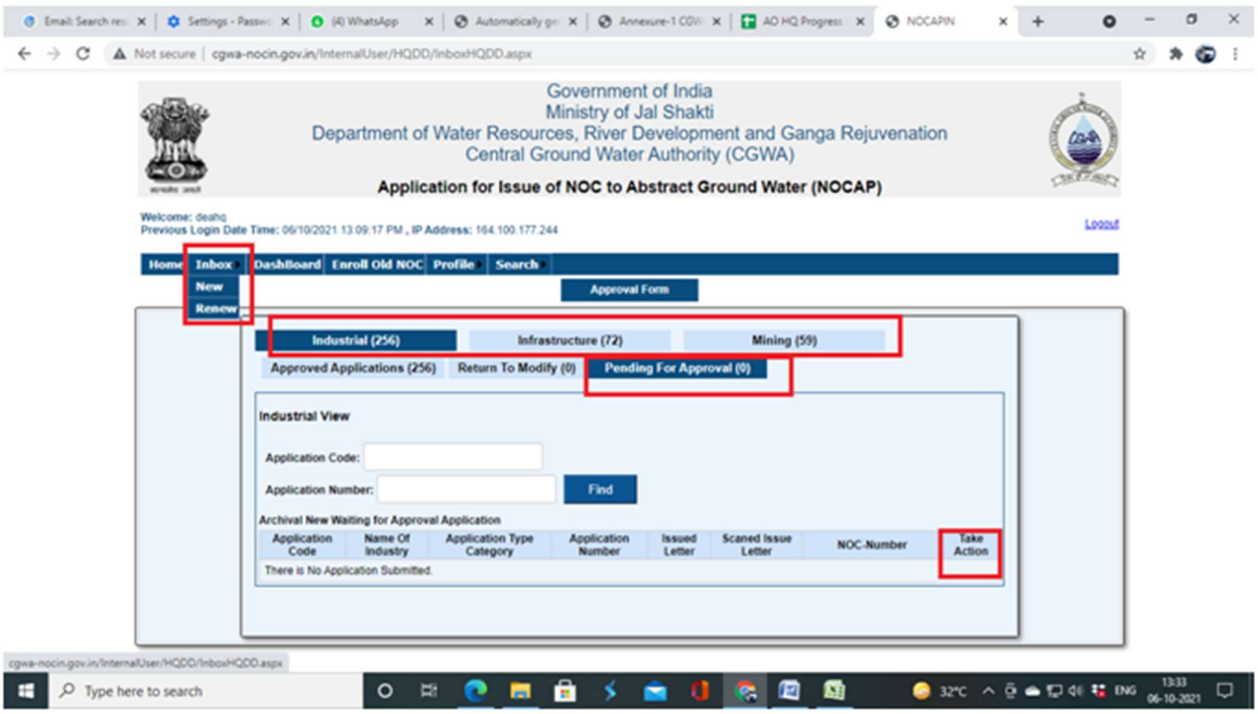
After filling all the details **"SUBMIT"** the application.

Step- 5

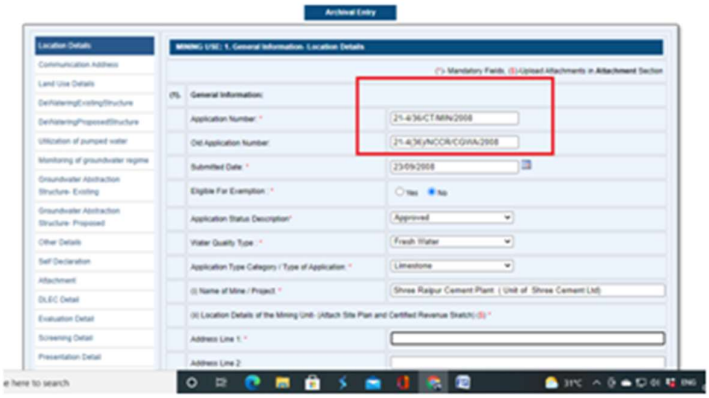
Log in using ID and PW of Data Entry Approval

Step- 6

Click on Inbox → New/Renew → Ind/Infra/Min → Pending for approval → Take action



Step – 7 Cross check the details entered by data entry operator

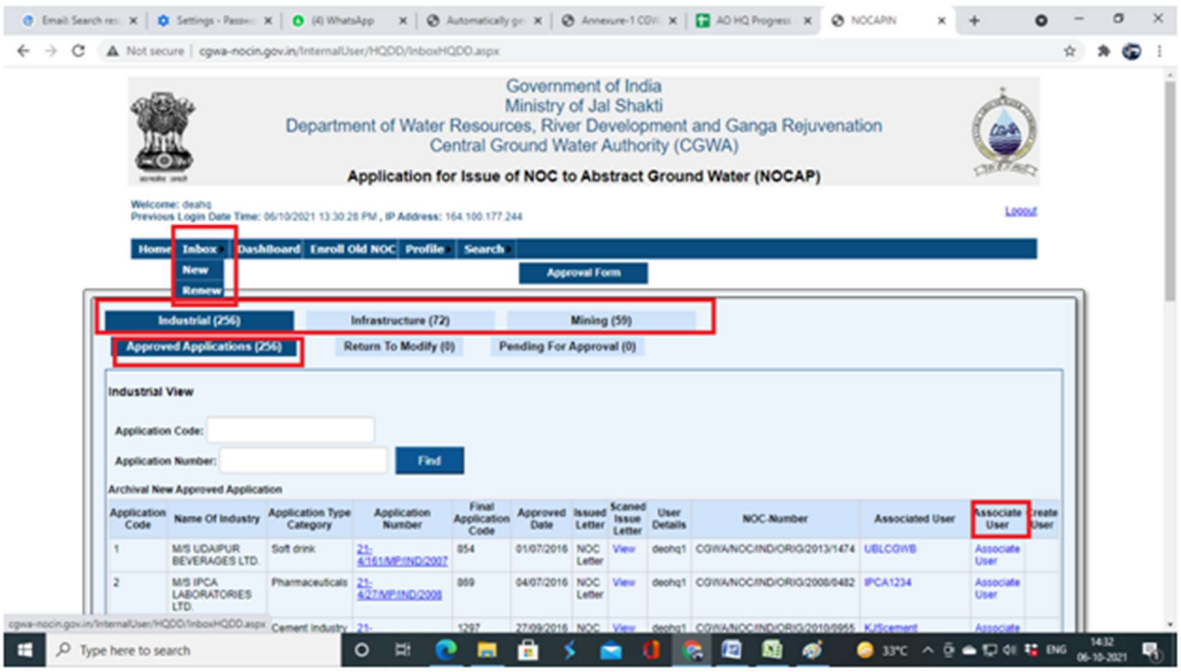


Step- 8

Go to the last page and approve the application.

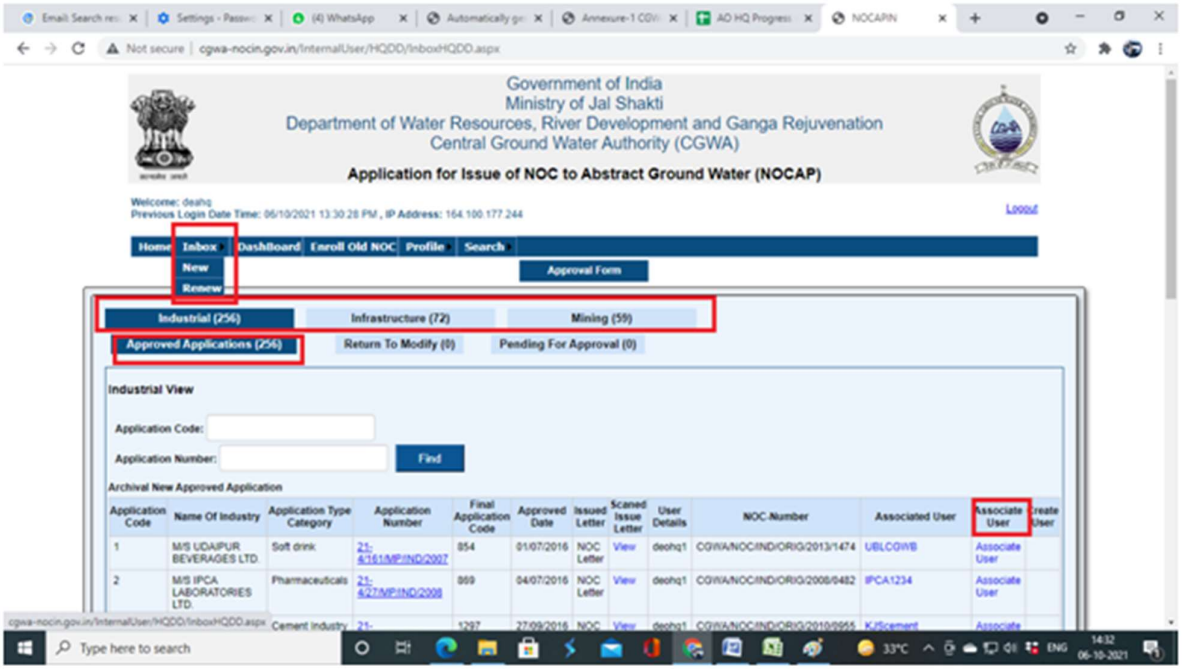
Step-9

Click on Inbox → New/Renew → Ind/Infra/Min → Approved applications → Associate User



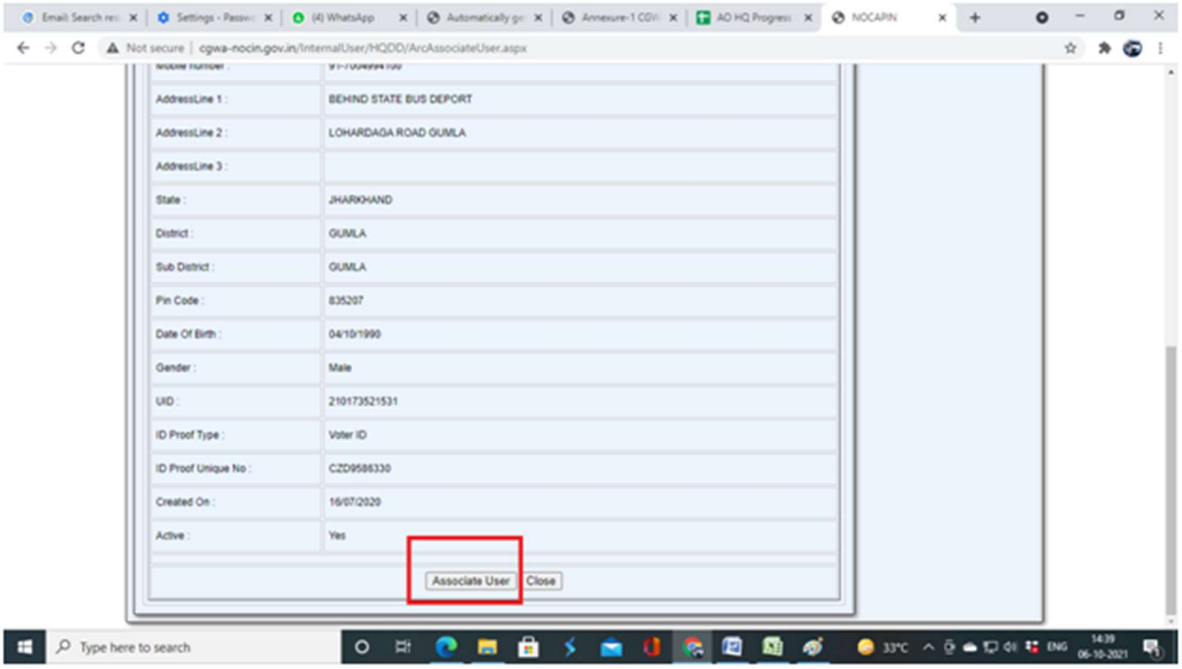
Step- 10

Select the user name provided by the applicant



Step-11

Click on Associate user


Not secure | cgwa-nocin.gov.in/InternalUser/HQDD/ArcAssociateUser.aspx
AddressLine 1 : BEHIND STATE BUS DEPORT
AddressLine 2 : LOHARDAGA ROAD GUMLA
AddressLine 3 :
State : JHARKHAND
District : GUMLA
Sub District : GUMLA
Pin Code : 835207
Date Of Birth : 04/10/1990
Gender : Male
UID : 210173521531
ID Proof Type : Voter ID
ID Proof Unique No : CZD9586330
Created On : 16/07/2020
Active : Yes
Associate User
Close
Type here to search

Illustration

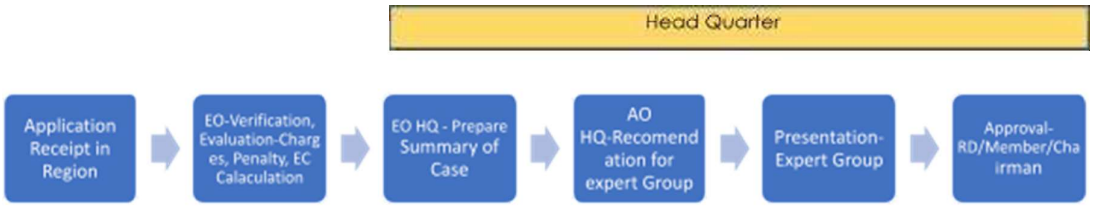
Cases up to 100 KLD – Regional Level

1. **Stages of Application Processing**

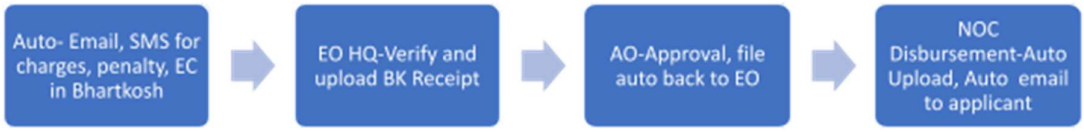
2. **Stages of NOC Processing and Disbursement**

Cases > 100 KLD

1. **Stages of Application Processing**



2. **Stages of NOC Processing and Disbursement**



1.9 Calculation of ground water abstraction/ restoration charges

1.9.1 Fresh NOC

- Ground water abstraction/ restoration charges will be calculated on annual basis.
- Charges as per categories of Ground Water Resource Assessment- as on 1st January of each year.
- Those who have already deposited charges, their charges will be revised as per new category w.e.f. 1st January of each year.
- Every year the PP will submit data on actual water consumption and charges for one year will be communicated to the PP with the direction to pay charges within 15 days, failing which their NOC shall be cancelled, tubewells will be sealed and EC will be imposed.
- Based on the actual water consumption, excess amount, if any, received during the previous year shall be adjusted while calculating charges for next year.
- If actual daily withdrawal of ground water exceeds the sanctioned quantum in more than -------- instances and the quantum drawn is such that the rate of ground water charges increases, then the rate as per the changed quantum shall be charged for number of days, the ground water withdrawal is in excess.
- If the actual quantum of ground water withdrawal per day is less and such that the rate of ground water charges falls in lower slab, then charges shall be payable as per the lower slab and the excess amount received shall be adjusted in the subsequent year.

1.9.1.1 Existing industries/ infrastructure/ mining projects

- In case of existing industries and mines, check the date of commencement of operation from CTE/ Industry profile/ Environmental Clearance.
- In case of existing infrastructure projects, check date of establishment.
- If the project is operational prior to 24.09.2020, charges will be payable from 24.09.2020.
- .

1.9.1.2 New industries/ mines/ infrastructure projects

- In case of new industries which have been established after 24.09.2020, charges will be payable from the date of start of validity of NOC.

1.9.2 Renewal of NOC

- In case of renewal of NOC, charges will be payable from 24.09.2020.
- The charges will be calculated from 24.09.2020 till date of completion of one year from date of start of validity of NOC.
- Ground water abstraction/ restoration charges will be calculated on annual basis.

- Charges as per categories of Ground Water Resource Assessment- as on 1st January of each year.
- Those who have already deposited charges, their charges will be revised as per new category w.e.f. 1st January of each year.

- Existing industries, infrastructure units and mining projects which have installed/constructed artificial recharge structures in compliance of the conditions prescribed in the groundwater guidelines prevailing at the time of grant of No Objection Certificate or its renewal shall be eligible for a rebate of 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges in each renewal, subject to their satisfactory performance and verification.
-
- Users located in safe areas, who had obtained NOC prior to 24.09.2020 and had implemented recharge measures to the tune of 50% or more of the annual ground water withdrawal shall be eligible for 50% rebate in each renewal.
- Users who had obtained NOC prior to 24.09.2020 but have failed to implement recharge measures as per the then prevailing guidelines (2015) shall be liable to pay penalty of Rs, 1 lakh and shall not be eligible for rebate in ground water abstraction/ restoration charges.
- Users who had obtained NOC prior to 24.09.2020 and have not been able to adopt recharge measures due to shallow ground water level in the area shall not be liable to pay penalty. But they will not be eligible for rebate in ground water abstraction/ restoration charges.
- Users who had obtained NOC prior to 24.09.2020 and had adopted recharge measures as per the recharge norms of the prevailing guidelines, but have failed to maintain those structures shall be liable to pay penalty of Rs. 1 lakh. Though they will be eligible to claim rebate as per the guidelines in ground water abstraction/ restoration charges.

Sample Calculation for Abstraction/Restoration Charges for renewal cases, assuming that category of the area has not changed :

Prior to 24.09.2020

Sample Calculator for Renewal NOC expiring prior to 24.09.2020					
GW requirement (m3/day)	525				
Annual quantum (m3/year)	1,91,625				
Area category	OE				
	Validity Start date	**Validity End date**			
Validity of Previous NOC	28-Feb-17	27-Feb-19			
Deemed to extended NOC validity (system generated)	28-Feb-19	27-Feb-21			
Renewed NOC Validity	28-Feb-21	27-Feb-23			
Abstraction charges calculated from 24-Sep-2020 to 27-Feb-2021 + 28-Feb-2021 to 27-Feb-2022					
	Date of New Guideline / Date of start of validity of renewed NOC	Date of NOC expiry	No. of Days for the abstraction charges to be paid / No. of	Rates of abstraction charges	Abstraction charges

			Operation days		
Abstraction charges to be paid from 24-09-2020 to 27-02-2021	24-Sep-20	27-Feb-21	157	10	824250
Abstraction charges to be paid from 28-02-2021 to 27-02-2022	28-Feb-21	27-Feb-22	365	10	1916250
Net Abstraction charges					27,40,500.00
Net Abstraction charges (after 50% rebate, If applicable)					13,70,250.00

After 24.09.2020

Sample Calculator for Renewal NOC expiring after 24.09.2020 and before the date of issuance of NOC					
GW requirement (m3/day)	430				
Annual quantum (m3/year)	1,56,950				
Area category	OE				
	Validity Start date	**Validity End date**			
Previous NOC Validity	31-Oct-18	30-Oct-20			
System generated NOC Validity	31-Oct-20	30-Oct-22			
Abstraction charges calculated from 24-Sep-2020 to 30-Oct-2020 + 31-Oct-2020 to 30-Oct-2021					
	Date of New Guideline / Date of start of validity of renewed NOC	Date of NOC expiry	No. of Days for the abstraction charges to be paid	Rates of abstraction charges	Abstraction charges
Abstraction charges to be paid from 24-Sep-2020 to 30-Oct-2020	24-Sep-20	30-Oct-20	37	10	159100
Abstraction charges to be paid from 31-Oct-2020 to 30-Oct-2021	31-Oct-20	30-Oct-21	365	10	1569500
Net Abstraction charges	17,28,600.00				
Net Abstraction charges (after 50% rebate, If applicable)	8,64,300.00				

Chapter-2
Documents Required

Documents required to be submitted with applications for various purposes are listed in this chapter.

2. 1 Issuance of NOC

2.1.1 Documents required for Industrial Projects

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
	Fresh (Industry)			
1	Consent to Establish/Operate from State Pollution Control Board or letter from MoEF, or letter from State level Environmental Impact Assessment Authority or any other letter from statutory agencies indicating date of commencement of project.	Yes	Yes	Yes
2	Certificate/Affidavit of non/partial availability of water from local government water supply agency in respect of all categories of assessment units	No	Yes	Yes
3	Ground water quality report of existing ground water abstraction structure from NABL accredited/ govt. approved lab (**In case of saline**).	Yes	Yes	Yes
4	Impact Assessment Report with GW modeling	No	No	Refer to **Para 8a** & **Appendix-A**
5	In OE Areas MSME Certificate in case of MSME (in case of water requirement is 10 KLD or more in OE areas, for new projects only) or Certificate of Medium Enterprise if groundwater requirement is less than 10 KLD	Yes	Yes	Yes
6	If located in Industrial Areas declared by Central/ State Govt, Documentary Proof of same	No	No	Yes
	Renewal (Industry)			
1	Site Inspection/ Self-inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	Yes	Yes	Yes
2	Water audit reports by certified auditors (in case of water requirement is more than 100 KLD) as per guidelines.	No	No	Yes
3	Certificate/Affidavit of non/partial availability of water from local government water supply agency in respect of all categories of assessment units	No	Yes	Yes
4	Ground water quality report of existing ground water abstraction structure from NABL accredited/ govt. approved lab (In case of saline)	Yes	Yes	Yes
5	Impact Assessment Report with GW modeling	No	No	Refer to **Para 8a** & **Appendix-A**
6	Documentary proof justifying the increase of quantum of GW abstraction.	Yes	Yes	Yes

7	If located in Industrial Areas declared by Central/ State Govt, Documentary Proof of same	No	No	Yes

2.1.2 Documents required for Infrastructure Projects

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
Fresh (Infrastructure)				
For construction activity				
1	Document as proof of new establishment / commencement of operation i.e. Consent to Establish/ Environmental Clearance/ building plan approval or any other document from a statutory agency **OR** Consent to Operate for existing projects from State Pollution Control Board or letter from MoEF, or letter from State level Environmental Impact Assessment Authority or any other letter from statutory agencies indicating date of commencement of project	Yes	yes	yes
2	Duly notarized affidavit on non-judicial stamp paper of Rs. 50/- by the applicant, confirming non/ inadequate availability of public water supply (in case water requirement is less than 10 KLD). ***OR***	Yes	No	No
3	Certificate from water supply agency regarding non/partial availability of water from any other source in case water is required for construction in safe and semi critical areas. ***OR***	No	Yes	Yes
4	Certificate from a government agency regarding non /partial availability of treated sewage water for construction within 10 km radius of the site in critical and over-exploited areas.	No	Yes	Yes
5	Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas	Yes	Yes	Yes
	Certificate/ Duly notarized affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500m from the periphery of demarcated wetland areas (only in the districts where the wetland is located)	Yes	Yes	Yes
6	Ground water quality report of existing / nearby existing wells ground water abstraction structure from NABL accredited/ govt. approved lab (In case of saline)	Yes	Yes	Yes
7	Bharatkosh receipt for depositing Application Fee, GW abstraction/restoration charges (for offline payment)	Yes	Yes	Yes
8	Copy of Rain Water Harvesting Plan submitted to Government agency by the applicant or a proposal for rain water harvesting/ recharge in the project premises as per the prevailing Model Building Bye Laws issued by Ministry of Housing & Urban Affairs, Government of India	Yes	Yes	Yes

9	Impact Assessment Report with ground water modelling by Accredited Consultant **in case Dewatering** is involved.	Refer to **Para 8c** & **Appendix-A**		
For Drinking and Domestic use:				
1	Document as proof of new establishment / commencement of operation, i.e. Consent to Establish/ Environmental Clearance/ any other document from a statutory agency ***OR*** Consent to Operate for existing projects from State Pollution Control Board or letter from MoEF, or letter from State level Environmental Impact Assessment Authority or any other letter from statutory agencies indicating date of commencement of project	Yes	Yes	Yes
2	Duly notarized affidavit on non-judicial stamp paper of Rs. 50/- by the applicant, confirming non/ inadequate availability of public water supply (in case water requirement is less than 10 KLD). ***OR***	Yes	No	No
	Certificate of non/partial availability of water from local government water supply agency in respect of all categories of assessment units.	No	Yes	Yes
3	Ground water quality report of existing / nearby ground water abstraction structure from NABL accredited/govt. approved lab	No	Yes	Yes
4	Water requirement for drinking and domestic purpose to be computed as per the National building code (NBC) 2016. (pl refer NOCAP portal, www.cgwa-noc.gov.in).	Yes	Yes	Yes
5	Completion certificate from the concerned agency for infrastructure projects/ duly notarized affidavit on non-judicial stamp paper of Rs. 50/- by the applicant.	No	Yes	Yes
6	Duly notarized affidavit on non-judicial stamp paper of Rs. 50/- regarding installation of STP (For New Projects) in case water requirement is more than 20 KLD	No	Yes	Yes
7	Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas	Yes	Yes	Yes
	Certificate/Affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500m from the periphery of demarcated wetland areas (only in the districts where the wetland is located)	Yes	Yes	Yes
8	Copy of Rain Water Harvesting Plan submitted to Government agency by the applicant or a proposal for rain water harvesting/ recharge in the project premises as per the prevailing Model Building Bye Laws issued by Ministry of Housing & Urban Affairs, Government of India	Yes	Yes	Yes
9	Bharatkosh receipt for depositing Application Fee and ground water abstraction/ restoration charges (**for Direct Bharatkosh payments**)	Yes	Yes	Yes
Renewal (Infrastructure)				

For construction activity (Renewal)				
1	Duly notarized affidavit on non-judicial stamp paper of Rs. 50/-by the applicant, confirming non/ inadequate availability of public water supply (in case water requirement is less than 10 KLD).	Yes	No	No
2	Certificate from water supply agency regarding non/partial availability of water from any other source in case water is required for construction in safe and semi critical areas. OR	No	Yes	Yes
3	Certificate from a government agency regarding non /partial availability of treated sewage water for construction within 10 km radius of the site in critical and over-exploited areas.	No	Yes	Yes
2	Site Inspection/ Self-inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	Yes	Yes	Yes
3	Ground water quality report of existing ground water abstraction structure from NABL accredited/ govt. approved lab (In case of saline)	Yes	Yes	Yes
4	Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas	Yes	Yes	Yes
	Certificate/ Duly notarized affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500m from the periphery of demarcated wetland areas (only in the districts where the wetland is located)	Yes	Yes	Yes
5	Bharatkosh receipt for depositing Application Fee, GW abstraction/restoration charges (**for Direct Bharatkosh payments -**)	Yes	Yes	Yes
	Impact Assessment Report with ground water modelling by Accredited Consultant in case Dewatering is involved.	Refer to **Para 8c** & **Appendix-A**		
7	Documentary proof justifying the increase of quantum of GW abstraction.	Yes	Yes	Yes
For Drinking and Domestic use:				
1	Duly notarized affidavit on non-judicial stamp paper of Rs. 50/- by the applicant, confirming non/ inadequate availability of public water supply (in case water requirement is less than 10 KLD). ***OR***	Yes	No	No
	Certificate of non/partial availability of water from local government water supply agency in respect of all categories of assessment units.	No	Yes	Yes
2	Self inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	Yes	Yes	Yes
3	Ground water quality report from NABL accredited/ Govt. approved laboratory	No	Yes	Yes
4	Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas	Yes	Yes	Yes
	Certificate/duly notarized Affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500 m from the periphery of demarcated wetland areas (only in the	Yes	Yes	Yes

	districts where the wetland is located)			
5	Water requirement for drinking and domestic purpose to be computed as per the National building code (NBC) 2016. (pl refer NOCAP portal, www.cgwa-noc.gov.in). Calculation of water requirement for green belt to be estimated as per the norms. (Norms: 3-5 lt./sqm)	Yes	Yes	Yes
6	Documentary proof justifying the increase of quantum of GW abstraction.	Yes	Yes	Yes

2.1.3 Documents required for Mining Projects

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
Fresh (Mining)				
1	Approved Mine Plan as per approving authority	Yes	Yes	Yes
2	Comprehensive hydrogeological report/ Modelling Study including year wise, bench wise Dewatering Impact Assessment on groundwater conditions in core and buffer zones of the mine by Accredited Consultants	Refer to **Para 8b** & **Appendix-A**		
3	Ground water quality report of existing well from NABL accredited/govt. approved lab **in case of saline.**	Yes	Yes	Yes
Renewal (Mining)				
1	Site Inspection/ Self-Inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	Yes	Yes	Yes
2	Comprehensive hydrogeological report/ Modelling Report including year wise, bench wise Dewatering Impact Assessment on groundwater conditions in core and buffer zones of the mine by Accredited Consultants	Refer to **Para 8b** & **Appendix-A**		
3	Water quality report of mine dewatering and existing tubewells/Borewells through NABL /Govt approved lab **in case of saline**	Yes	Yes	Yes

2.1.4 Documents required for Residential apartments/Group Housing societies

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
Fresh (Residential apartments/Group Housing societies)				
1	Document as proof of new establishment / commencement of operation i.e. Consent to Establish/ Environmental Clearance/ any other document from a statutory agency ***OR*** Consent to Operate for existing projects from State Pollution Control Board or letter from MoEF, or letter from State level Environmental Impact Assessment Authority or any other letter from statutory agencies indicating date of commencement of project	Yes	Yes	Yes
2	Affidavit on non-judicial stamp paper of Rs.	Yes*	NA	NA

	10/- by the applicant, confirming non/ inadequate availability of public water supply (in case of ground water requirement up to 10 KLD)*			
	Certificate of non/partial availability of water from local government water supply agency (in case of ground water requirement more than 10 KLD)*	NA	Yes*	Yes*
3	Ground water quality report of existing or nearby ground water abstraction structure from NABL accredited/govt. approved lab	No	Yes	Yes
4	Water requirement for drinking and domestic purpose to be computed as per the National building code (NBC) 2016. (pl refer NOCAP portal, www.cgwa-noc.gov.in)	No	Yes	Yes
5	Installation of STP in case of water requirement is more than 20 KLD (for new projects)	No	Yes	Yes
6	Detailed report from projects falling within 500 m from the periphery of demarcated wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas	Yes	Yes	Yes
	Certificate/duly notarized Affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500m from the periphery of demarcated wetland areas (only in the districts where the wetland is located)	Yes	Yes	Yes
7	Copy of Rain Water Harvesting Plan submitted to Government agency by the applicant or a proposal for rain water harvesting/ recharge in the project premises as per the prevailing Model Building Bye Laws issued by Ministry of Housing & Urban Affairs, Government of India	Yes	Yes	Yes

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
Renewal (Residential apartments/Group Housing societies)				
1	Self inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	Yes	Yes	Yes
2	Affidavit on non-judicial stamp paper of Rs. 10/- by the applicant, confirming non/ inadequate availability of public water supply (in case of water requirement is up to 10 KLD)*	Yes*	NA	NA
	Certificate regarding non/partial availability of water supply from the local government water supply agency*	NA	Yes*	Yes*
3	Ground water quality report of existing well from NABL accredited/govt. approved lab	Yes	Yes	Yes
4	Detailed report from projects falling within 500 m from the periphery of demarcated	Yes	Yes	Yes

	wetland areas indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas			
	Certificate/duly notarized Affidavit (on non-judicial stamp paper of Rs. 50) of wetland from projects falling beyond 500 m from the periphery of demarcated wetland areas (only in the districts where the wetland is located)	Yes	Yes	Yes
5	Documentary proof justifying the increase of quantum of GW abstraction.	Yes	Yes	Yes

*The categories are exempted up to 20 KLD except if there is Swimming Pool in the Society/ Apartments

2.1.5 Documents required for government water supply agencies

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
Fresh (Government water supply agencies)				
1	Approval of the scheme/project	Yes	Yes	Yes
2	Ground water quality report of existing or nearby well from NABL accredited/govt. approved lab	No	Yes	Yes
3	Water requirement for drinking and domestic purpose to be computed as per the National building code (NBC) 2016. (pl refer NOCAP portal, www.cgwa-noc.gov.in)	Yes	Yes	Yes
Renewal (Government water supply agencies)				
1	Affidavit on compliance report of NOC conditions for renewal cases, in case of water requirement is less than 100 KLD (pl refer NOCAP portal, www.cgwa-noc.gov.in)	Yes	No	No
	Self-Inspection report (pl refer NOCAP portal, www.cgwa-noc.gov.in) and compliance report	No	Yes	Yes
2	Ground water quality report of existing well from NABL accredited/govt. approved lab	No	Yes	Yes

2.1.6 Documents required for Bulk Water Supply

Sl. No.	Documents	Withdrawal Less than 10 KLD	Withdrawal between 10 to 100 KLD	Withdrawal more than 100 KLD
1	Proof of ownership of land of size 200 sqm or more on which abstraction structure is installed	Yes	Yes	Yes
2	GW Quality Report of existing or nearby ground water abstraction structure from NABL accredited/ govt. approved lab	Yes	Yes	Yes
4	Proof of ownership/ Lease of tanker/ RC Book.	Yes	Yes	Yes

For all types of projects Note:

Affidavit (self-Declaration) on Rs 50/ stamp paper is to be submitted by the Project Proponent, in case he/she fails to produce the required documents related to non/ inadequate availability of public water supply from the concerned authorities. They are liable to face legal action in case the information furnished by the applicant is found to be incorrect.

After checking of the documents and approval from the Admin/Members/Chairman the NOC will be kept pending till the firm submit required water abstraction/restoration charges and penalty.

Chapter 3

Abstraction of Saline Groundwater

Abstraction of saline ground water in areas having either saline ground water at all depths or pockets of saline ground water in an otherwise fresh water area for use by industries/ dewatering by infrastructure/ mining projects including those located in over-exploited areas would be encouraged. Such industries shall be exempted from paying ground water abstraction charges. **However, in case of delayed submission of application, EC shall be applicable as per the rates prescribed for illegal extraction in Safe Areas**.

However, due care shall be taken in respect of disposal of effluents by the units so as to protect the water bodies and the aquifers from pollution. Detailed guidelines in this regard are given below.

3.1 Detailed Guidelines for Abstraction of Saline Ground Water

Water having EC above 5000 μ siemens/cm at 25∘C is saline water. Any user desirous of utilizing saline groundwater is permitted to extract saline ground water and will be exempted from payment of ground water abstraction / restoration charges. However, all such users need to have proper effluent water disposal plan to avoid degrading of environment/ surroundings. Further, NOC shall not be granted to new major industries in over-exploited assessment units.

No Objection Certificate for saline ground water extraction shall be granted subject to the following specific conditions:

3.1.1 Completely Saline Assessment Units

a) All the users withdrawing more than 100 KLD of saline groundwater, need to submit Impact Assessment Report with Modelling including water level /water quality /land subsidence in and around the project area.
b) Ground water quality data of existing bore well/ tube well/ dug well from any NABL accredited laboratory or Govt. approved laboratory.
c) Oil and Mining companies to submit approved plan by the concerned Govt. agency/ department in case of abstraction/dewatering or injection.

d) All the users' need to adopt rain water harvesting as per building bye laws within premises.

3.1.2 Partially Saline Assessment Units

In the areas where saline water occur in lenses or fresh and saline zones overly/ underly each other, saline water ingress is expected. In such cases, information on depth wise occurrence of saline/ fresh ground water zones/ interface shall be made available by Regional Office, CGWB.

a) All the users who need to draw saline ground water more than 100 KLD shall submit Impact Assessment Report with modelling, indicating saline - fresh water interface, impact of saline ground water abstraction on the ground water regime or impact of saline water pumping on saline water ingress in coastal areas. The saline water withdrawal shall avoid up coning of saline water into fresh water, mixing or ingress towards land.

b) Piezometer should be constructed and regular monitoring to be taken up for piezometric level & water quality of the aquifer from which the saline water is pumped, as well as, the adjacent/ overlying/underlying fresh water aquifers.

c) In case well starts yielding fresh water instead of saline water, project proponent shall immediately inform the Regional Office, CGWB. The project proponent shall have to pay groundwater abstraction /restoration charges as per the guidelines.

d) All the users' needs need to adopt rain water harvesting as per building bye laws within premises

Chapter 4

Groundwater Abstraction/ Restoration Charges/ Penalties and Environmental Compensation

Every (existing/ new/ renewal) project proponent (Drinking and domestic use for residential apartments/Group Housing Societies/ Government Water Supply agencies in Urban areas Infrastructure, Industry, Mining, Packaged drinking water units, Bulk water suppliers) has to pay Groundwater abstraction/ restoration charges w.e.f. 24/9/2020 as well as Environmental Compensation (wherever applicable) as mentioned in Section 5 and 6 of revised CGWA Guideline (2020) dated 24/9/2020 and amendment dated 29.03.2023 thereof.

4.1 Groundwater Abstraction/ Restoration Charges

- All residential apartments/ group housing societies/ Government water supply agencies in urban areas shall be required to pay ground water abstraction charges.
- All industries/mining/ infrastructure projects drawing ground water in safe, semi-critical and critical assessment units will have to pay ground water abstraction charges based on quantum of ground water extraction and category of assessment unit as per details given in this guideline.
- All existing mining/ infrastructure projects and existing industries including MSME drawing ground water in over-exploited assessment units will have to pay ground water restoration charges based on quantum of ground water extraction. Further, new MSME, new infrastructure and new Mining projects in over exploited areas shall also be required to pay ground water restoration charges.
- Existing industries, infrastructure units and mining projects which have installed/constructed artificial recharge structures in compliance of the conditions prescribed in the groundwater guidelines prevailing at the time of grant of No Objection Certificate or its renewal shall be eligible for a rebate of 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges in each renewal, subject to their satisfactory performance and verification.
- Users who had obtained NOC prior to 24.09.2020 and have adopted artificial recharge but do not satisfy the recharge norms as per the prevailing guidelines (2015) will not qualify for rebate till they complete recharge interventions.
- Users located in safe areas, who had obtained NOC prior to 24.09.2020 and had implemented recharge measures to the tune of 50% or more of the annual ground water withdrawal shall be eligible for 50% rebate in each renewal.
- Users who had obtained NOC prior to 24.09.2020 but have failed to implement recharge measures as per the then prevailing guidelines (2015) shall be liable to pay penalty of Rs, 1 lakh and shall not

be eligible for rebate in ground water abstraction/ restoration charges.

- Users who had obtained NOC prior to 24.09.2020 and have not been able to adopt recharge measures due to shallow ground water level in the area shall not be liable to pay penalty. But they will not be eligible for rebate in ground water abstraction/ restoration charges.
- Users who had obtained NOC prior to 24.09.2020 and had adopted recharge measures as per the recharge norms of the prevailing guidelines, but have failed to **maintain** those structures shall be liable to pay penalty of Rs. 1 lakh. Though they will be eligible to claim rebate as per the guidelines in ground water abstraction/ restoration charges in each renewal.

4.2 Compliance Monitoring and taking punitive action

Technical officers of CGWB/ CGWA and State groundwater organizations are authorized to take actions with respect to monitoring and periodic inspections with the approval of competent authority.

The ground water users shall fill up self inspection module and submit for compliance monitoring. Random inspections shall be carried out physically by Regional Offices of CGWB in 10% of the cases. Proforma for site inspection is given in Annexure III.

4.2.1 Issuance of show cause notice

Show Cause Notice is to be issued under the following circumstances:

1) If a ground water user who has obtained NOC but has failed to submit self compliance report.
2) If a ground water user who has obtained NOC fails to comply with any of the conditions specified in the NOC.
3) If a ground water user furnished false information regarding quantum of ground water withdrawal.
4) If a ground water user fails to apply for renewal of NOC in time as per the guidelines.
5) If a ground water user withdraws ground water without obtaining NOC.

Samples of show cause notices are given in **Annexures 4 to 8.**

4.2.2 Provision of Penalty

Penalty shall be imposed on the proponents for non-compliance of No Objection Certificate conditions issued by the appropriate authority. Rates of penalty proposed for non-compliance of various conditions of No Objection Certificate are given in Table 16.1 of the revised CGWA Guideline (2020). Provision of Penalty is for renewal cases or projects who had got NOC for ground water abstraction/de-watering and have failed to comply with the conditions specified in the NOC. The penalty as per notified guidelines shall be applicable in cases of violations/ non -compliance where NOC has been granted after 24.09.2020. In cases of violations/ non -compliance, where NOC had been granted prior to 24.09.2020, penalty of Rs. 1 lakh as per Section 15 of EPA shall be applicable.

4.2.3 Environmental Compensation

Extraction of groundwater for commercial use by industries, infrastructure units and mining projects without a valid No Objection Certificate from appropriate authority shall be considered illegal and such entities shall be liable to pay Environmental Compensation for the quantum of groundwater so extracted. The norms prescribed as per the guidelines shall be utilized for calculating the Environmental compensation as mentioned below:

EC_{GW}= Groundwater consumption per day x Environmental Compensation rate (ECR_{GW}) x No. of days (pro-rata basis) x Deterrence factor.

Deterrence Factor based on the duration of illegal ground water extraction shall be applied to compensate losses and environmental damage (for packaged drinking water units e.g. mining, industries, infrastructure, and infrastructural dewatering projects) as per Table 15.4 of the Guidelines.

Environmental compensation will be imposed based on groundwater abstraction, type of project and category of block in accordance with Guidelines 2020 dated 24/9/2020. Minimum Environmental compensation is Rs. 1,00,000/- irrespective of quantity, type and category of block.

4.2.4 Taking punitive action and Prosecution

District Magistrate/ District Collector/ Sub Divisional Magistrates of each Revenue District/Sub division as Authorized Officers, have been delegated the power to:

- Seal illegal wells,
- Disconnect electricity supply to the energized well,
- Launch prosecution against offenders etc.
- Grievance redressal related to ground water.

In order to further decentralise and strengthen the monitoring and compliance mechanism as per the guidelines, officials of concerned Departments of Revenue and Industries of respective States/ Union Territories shall also be appointed as Authorized officers in consultation with the State/ UT Governments.

Chapter 5

Implementation of Artificial Recharge

All the units should implement rooftop rainwater harvesting system in the buildings within its lease area, as per the model building bye-laws issued by Ministry of Housing & Urban Affairs / Local Authority.

Artificial Recharge Plans may be prepared based on "Manual on Artificial Recharge of Ground Water Recharge" as prepared by Central Ground Water Board and available on CGWB website http://cgwb.gov.in/documents/.

5.1 Artificial Recharge/ Rain Water Harvesting Measures

- Roof top/paved area/open area rain water harvesting/ recharge is mandatory in the project premises except industries which are likely to pollute groundwater (chemical, pharmaceutical, dyes, pigments, paints, textiles, tannery, pesticides/ insecticides, fertilizers, slaughter house, explosives etc.). **In such cases project proponents shall store the harvested rain water in surface storage tanks for use in the industry.**
- In renewal cases, if any project has successfully executed recharge measures as specified in NOC issued prior to 24.09.2020 and maintaining recharge structures within and outside premises/mining lease area, they will be **entitled for a rebate of 50% in ground water abstraction/restoration charges in each renewal**.
- All the projects withdrawing saline ground water shall store rainwater runoff generated within premises in surface storage tanks for use in the project.

5.2 Conditions regarding Design and Number of Recharge/Storage Structures

1. For design and number of recharge/storage structures (only from roof top) are to be computed based on intensity of rainfall i.e. mm/15 min (20 to 40mm depending on area and rainfall pattern). The number of structures should be optimized so that maximum rainwater can be harvested.
2. Depth of recharge structure should be down to water level in alluvium area and down to weathered part encountered in hard rock area. Recharge shaft is suitable for the area where water level is within 30m from ground level. Injection wells beyond impervious layers are suitable where water level is more than 30m.
3. Trench with recharge shaft may be suitable in hard rock areas depending on hydraulic conductivity of formation and water level. If abandoned/functional dug

well/tube well/bore well is already existing, these can be utilized for recharge purpose with due care to avoid contamination.

4. Collection of rainwater from surfaces other than roof-top should include specifically designed collection system.
5. Storm water drainage line should be separate from waste water drainage line.
6. BIS Standard **IS 15797:2008** for Roof Top RWH may be consulted and adhered to.

Chapter 6

Amendments approved in CGWA Board Meetings

6.1 Amendments approved in 46th CGWA Meeting 08-06-2021

1. Applications for fresh/ renewal of NOC by the existing users which have been rejected on grounds of either non-submission of required documents or non- fulfilment of various documents/ criteria, shall be given a one-time relaxation. Such existing users who have re-applied for NOC after 30.06.2020 shall be exempted to pay Environmental Compensation/ Penalty till 31.03.2022. However, they shall be liable to pay the water abstraction/ restoration charges w.e.f. 24.09.2020.

2. Exemption of EC shall also be applicable to existing users who have failed to submit application for NOC till 30.06.2020. However, they shall be liable to pay penalty of Rs. one lakh. They shall also be liable to pay ground water abstraction/ restoration charges w.e.f. 24.09.2020 or date of its commencement whichever is later.

3. For the submission of Impact Assessment Reports by industries, Comprehensive Hydrogeological reports by Mining Projects and Water Audit Reports, the date is hereby extended upto 31.03.2022. No Environmental Compensation shall be imposed on such users if the said report is submitted in the prescribed time. The Environmental Compensation already paid by the project proponents shall be adjusted in the Abstraction/restoration Charges of the unit for subsequent years.

4. To reduce the financial burden on the project proponents, the project proponents shall now be required to make a yearly advance payment of the Ground Water Abstraction/Restoration Charges, which would be adjusted in succeeding years based on actual ground water withdrawal, instead of one-time advance payment of Ground Water Abstraction/Restoration Charges for entire NOC period.

5. All the project proponents/users drawing ground water shall be required to mandatorily install tamper-proof Digital Water Flow Meter with/ without Telemetry System by 31.03.2022 or as specified in NOC, whichever is later.

6. The applicants/project proponents who are facing the issue of double taxation due to levy of water charges/ cess by States as well as water abstraction/restoration charges by CGWA, may seek reimbursement of water charges/ cess paid to State Governments from CGWA in the subsequent years limited to the water abstraction/restoration charges levied by CGWA.

6.2 Amendments Approved in 45thCGWA Meeting 21-01-2021

1. The applicants, who are required to conduct modeling studies shall keep the model for at least 3 years. CGWA shall maintain archive of models.

2. It was agreed that existing industries which are located in safe areas and had submitted their applications prior to 24.09.2020 may be given time extension for submission of impact assessment reports till 30.06.2021 and no Environmental Compensation should be imposed w.e.f. 1.1.2021 on such units, as it was not mandatory for such industries as per the notified guidelines. Conditional NOC shall be issued in such cases.

3. Time frame for submission of Impact Assessment Report in Over-exploited, Critical and Semi-critical areas by 30.6.2021 and Environmental Compensation shall be imposed in such cases w.e.f. 1.1.2021 till the date of submission of report. Their applications will not be rejected as they are existing industries.

   In case of mining projects, who had submitted their applications prior to 24.09.2020, it was agreed that time for submission of comprehensive hydrogeological report as per the revised proforma shall be extended till 30.6.2021 and Environmental Compensation shall be imposed w.e.f. 1.1.2021. It was decided that a letter in this regard shall be sent to the Secretary, Ministry of Coal & Mining by the Authority to keep him informed about the decisions taken.

4. The installation of tamper proof digital water flow meters for ground water withdrawal < 10 KLD and tamper digital water flow meter with telemetry > 10 KLD on ground water abstraction structures are made mandatory.

5. Members approved the draft guidelines for saline ground water abstraction with a few minor modifications such as provision of online/real time monitoring of Electrical Conductivity of ground water being extracted by the applicant and dropping the requirement of submission of data on land subsidence.

6. Guidelines for bulk water supply with the following suggestions:

   a. It should be only for drinking and domestic purposes.

   b. Agency responsible for monitoring of water quality being supplied by bulk water suppliers through private tankers may be specified.

   c. Condition of GPS tracking should be removed.

7. Ministry of Environment, Forests and Climate vide its notification dated 27.09.2020 has extended the validity of Environmental Clearance of all such projects, which was due to expire during 2020-2021 to 31st March, 2021 or six months from the date of expiry whichever is earlier. ***Vide another***

notification dated 18.12.2020, the MoEF&CC has informed that the year 2020-21 shall not be considered for the purpose of the calculation of the period of validity of Terms of Reference and the prior Environmental Clearances granted by the Ministry. It was agreed that CGWA may also bring out a Public Notice stating that validity of NOCs issued, which were due to expire during 2020-2021 shall be deemed to be extended till 31.3.2021.

6.3 Amendments Approved in 44th CGWA Meeting 20-10-2020

1. Obtaining Water Quality Report from NABL Accredited Lab as mandatory documents from project proponents (PP) for the cases where the water requirement is < 10 KLD and cases were submitted before 24/9/2020.

   Water Quality Report from Accredited NABL lab in **such cases shall not be mandatory document** and PP may be exempted from submitting this document.
2. Obtaining Impact Assessment Report from the proponents drawing more than 100 KLD in Critical and Semi – critical assessment units and Water Audit Report from those drawing more than 100 KLD in Critical, Semi-critical and Safe assessment units in case of applications received prior to 24.09.2020.

   NOC may be issued subject to the condition that the proponent will submit **Impact Assessment Report prepared by Accredited Consultant by 30/6/2021 and Water Audit Report prepared by certified auditors** by 31/03/2021 (only in renewal cases). **Failure to submit the above reports in the prescribed time, will lead to cancellation of NOC.** The NOC Cases for **Over Exploited Assessment Units shall continue to be processed as per the notified guidelines dated 24/9/2020**.
3. Processing of the existing cases submitted in NOCAP **between 30/6/2020 and 24/9/2020.** In all such cases, a penalty of Rs 1 lakh will be imposed.

4. Processing of the existing cases submitted in NOCAP **after 24/9/2020 -** In all such cases, environmental compensation as per guidelines will be imposed.
5. To speed up the process of issuance of NOC, the delegation of power to approve NOC to the Regional Offices and various functionaries at CHQ is given below:

Quantum of GW abstraction (m3/day)	Approving Authority
Up to 100	Regional Director of the Region
>100 to 500	Regional Director, CGWA
>500 to 1000	Member, CGWA

1000	Chairman

6. Application fee has been increased for issuance of fresh NOC from Rs. 1000 to Rs. 10000 and that for renewal of NOC from Rs. 500 to Rs. 5000. Provision in the Bharatkosh have been made under the head Water resources>NOC Processing Fee Revised Fresh application and Water resources>NOC Processing Fee Revised for Renewal

Annexure-1

File No. CGWA-NOCA/4/2020-CGWA
Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Authority

CORRIGENDUM

Sub: Partial Modification of CGWA Public Notice No. 8/2022, dated 13.10.2022

In partial modification of this Authority's Public Notice **8/2022**, dated **13.10.2022,** following **revision** in **Point-5** is hereby made**.**

Point 5 of the above Notice should be read as following.

5. PP can request for revival of rejected application within 60 days of rejection of application (excluding date of rejection). Revival shall be subject to payment of Revival Charges (**presently, Rs 10,000/-**) and fulfilling requirements due to which the application was rejected *(Advance Abstraction Charges and/or incomplete documents)*.

(Member Secretary)
CGWA

File No. CGWA-NOCA/4/2020-CGWA
Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Authority

PUBLIC NOTICE No. 08/2022

New Delhi, Dated 13th October, 2022

ATTENTION: ALL PPs SUBMITTING GROUND WATER NOC APPLICATIONS WITHOUT FULL PAYMENT OF ADVANCE ABSTRACTION/ RESTORATION CHARGES AND/ OR WITHOUT COMPLETE DOCUMENTS

It has come to notice that a number of project proponents are submitting applications without making full payment of Advance Abstraction/ Restoration Charges, as calculated by '*Know Your Charges*' (*https://cgwa-noc.gov.in/Sub/Report/GWChargesCalculation/GWChargesCalculation.aspx*) tool (available under Users' Assistance) as per the quantum applied, number of days and category of block.

In the above context, following may be noted.

1. Before applying for/submission of NOC, the PP should calculate Advance Abstraction/ Restoration Charges through the link '***Know Your Charges***' (*https://cgwa-noc.gov.in/Sub/Report/GWChargesCalculation/GWChargesCalculation.aspx*) and deposit **same amount** before submission of NOC Application.

2. Arrears (wef 24.9.2020 or Date of Commencement of Project, whichever is later) and other charges (such as Penalty/ Environmental Compensation), ***if any*** shall be communicated after approval of NOC and shall have to be deposited by PP for final issuance of NOC.

3. At pre-application submission stage, **all payments** (Application Fee, Abstraction/ Restoration Charges) should be made through **either one** of the two Payment Gateways (Direct Bharatkosh or Via NOCAP). Part payments through different gateways shall not be accepted.

4. Applications submitted **without payment of full** Advance Abstraction/ Restoration **Charges** as calculated above **and/ or without complete documents** shall be **rejected forthwith**. Please note that **Application Fee is non-refundable**.

5. Rejected application can be revived by paying Revival Charges of **Rs 10,000/-**.

6. Final issuance of NOC shall be subject to payment of arrears (wef 24.9.2020 or Date of Commencement of Project, whichever is later)/ Penalty/ EC, ***if any.*** These charges, ***if any***, shall be separately communicated later after scrutiny of documents.

(Member Secretary)
CGWA

Annexure-2

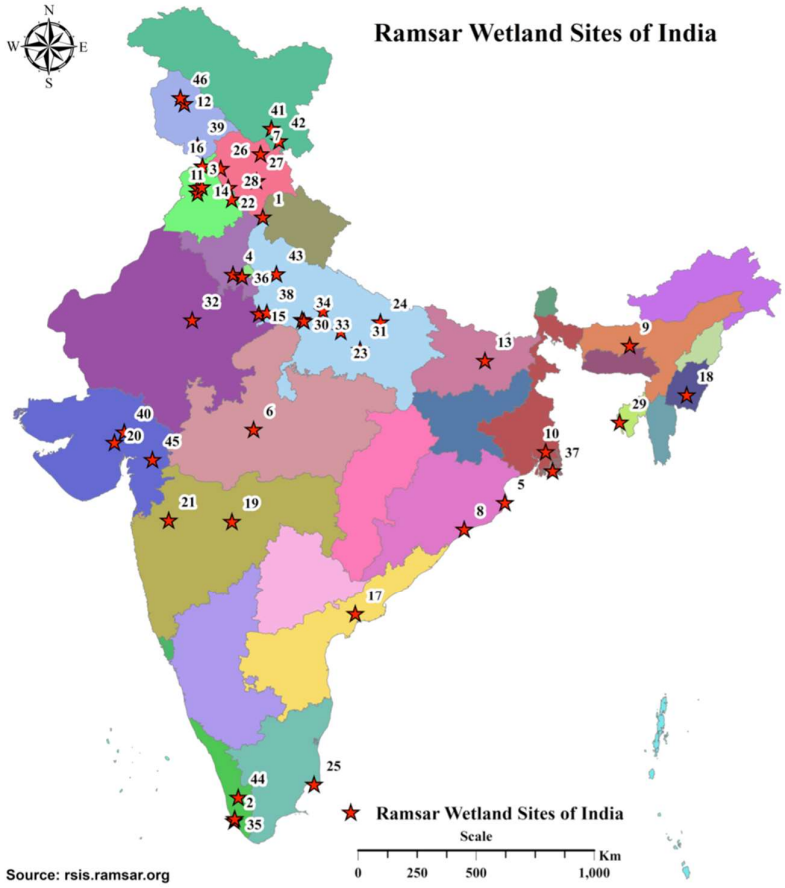
Projects falling beyond 500m from the periphery of demarcated wetland areas shall submit Certificate/ Affidavit of wetland only in the districts where the wetland is located. List of the demarcated wetlands and their districts of occurrence is given below:

List of Notified Wetlands in India as per Ramsar

State	Covered Districts	Name of Wetland
Andhra Pradesh	West Godavari and Krishna	Kolleru Lake
Assam	Kamrup Metropolitan and Kamrup	DeeporBeel
Bihar	Begusarai	Kabartal Wetland
Gujarat	Vadodara and Chhota Udaipur	Wadhvana Wetland
Gujarat	Ahmadabad and Surendranagar	Nalsarovar
Gujarat	Mahesana and Gandhinagar	Thol Lake Wildlife Sanctuary
Haryana	Jhajjar	Bhindawas Wildlife Sanctuary
Haryana	Gurgaon	Sultanpur National Park
Himachal Pradesh	Lahaul&Spiti	Chandertal wetland
Himachal Pradesh	Kullu	Renuka Wetland
Himachal Pradesh	Kangra	Pong Dam lake
Himachal Pradesh	Kangra	Beas Conservation reserve
Himachal Pradesh	Bilaspur and Una	Nangal Wildlife sanctuary
Himachal Pradesh	Sirmaur	Asan Conservation reserve
Himachal Pradesh	Lahaul&Spiti	Tso Morrori
Jammu Kashmir	Baramulla and Gandebal	Wular Lake
Jammu Kashmir	Badgam and Baramulla	Hokera
Jammu Kashmir	Jammu and Udhampur	Surinsar-Mansar Lakes
Kerala	Kollam	Ashtamudi Wetland
Kerala	Kollam	Sasthamkotta Lake

Kerala	Kottayam, Ernakulam and Alappuzha	Vembanad-Kol Wetland
Ladakh	Leh	Tso Morrori
Ladakh	Leh	Tso Kar wetland complex
Madhya Pradesh	Bhopal	Bhoj Wetland
Maharashtra	Nashik	NandurMadhameshwar
Maharashtra	Buldhana	Lonar Lake
Manipur	Bishnupur, Imphal and Thoubal	Loktak Lake
Odisha	Kendrapara and Bhadrak	Bhitarkanika Mangroves
Odisha	Puri, Khorda and Ganjam	Chilika Lake
Punjab	Pathankot, Gurdaspur, Amritsar, Tarn Taran, Hoshiarpur, Kapurthala, Firozpur	Beas Conservation reserve
Punjab	Gurdaspur	Keshopur-Miani Community Reserve
Punjab	Kapurthala	Kanjli
Punjab	Kapurthala	Harike Lake
Punjab	Rupnagar	Nangal Wildlife sanctuary
Punjab	Shahid Bhagat Singh Nagar and Rupnagar	Ropar
Rajasthan	Bharatpur	Keoladeo National Park
Rajasthan	Nagaur, Jaipur and Ajmer	Sambhar Lake
Tripura	Sipahijala	Rudrasagar Lake
Uttar Pradesh	Amroha and Bulandshahar	Upper Ganga River
Uttar Pradesh	Mainpuri and Etawah	Saman Bird Sanctuary
Uttar Pradesh	Mainpuri and Etawah	SarsaiNawarJheel
Uttar Pradesh	Hardoi	Sandi Bird Sanctuary
Uttar Pradesh	Unnao	Nawabganj Bird Sanctuary
Uttar Pradesh	Amethi	Samaspur Bird Sanctuary
Uttar Pradesh	Gonda	Parvati Arga Bird Sanctuary
Uttar Pradesh	Agra and Mathura	Sur Sarovar

Uttarakhand	Dehradun	Asan Conservation reserve
West Bengal	South 24 Parganas, Calcutta, North 24 Parganas	East Calcutta Wetlands
West Bengal	South 24 Parganas and North 24 Parganas	Sundarban Wetland



S.No	Site Name	Designation Date	Area (Sq. Km)
1	Asan Conservation Reserve	21-07-2020	440.33
2	Ashtamudi Wetland	19-08-2002	374.87
3	Beas Conservation Reserve	26-09-2019	437.34
4	Bhindawas Wildlife Sanctuary	25-05-2021	443.41
5	Bhitarkanika Mangroves	19-08-2002	374.87
6	Bhoj Wetland	19-08-2002	374.87
7	Chandertal Wetland	08-11-2005	386.64
8	Chilika Lake	01-10-1981	298.6
9	Deepor Beel	19-08-2002	374.87
10	East Calcutta Wetlands	19-08-2002	374.87
11	Harike Lake	23-03-1990	329.55
12	Hokera Wetland	08-11-2005	386.64
13	Kabartal Wetland	21-07-2020	440.33
14	Kanjli	22-01-2002	372.78
15	Keoladeo National Park	01-10-1981	298.6
16	Keshopur-Miani Community Reserve	26-09-2019	437.34
17	Kolleru Lake	19-08-2002	374.87
18	Loktak Lake	23-03-1990	329.55
19	Lonar Lake	22-07-2020	440.34
20	Nalsarovar	24-09-2012	411.76
21	Nandur Madhameshwar	21-06-2019	436.37
22	Nangal Wildlife Sanctuary	26-09-2019	437.34
23	Nawabganj Bird Sanctuary	19-09-2019	437.27
24	Parvati Arga Bird Sanctuary	02-12-2019	438.01
25	Point Calimere Wildlife and Bird Sanctuary	19-08-2002	374.87
26	Pong Dam Lake	19-08-2002	374.87
27	Renuka Wetland	08-11-2005	386.64
28	Ropar	22-01-2002	372.78
29	Rudrasagar Lake	08-11-2005	386.64
30	Saman Bird Sanctuary	02-12-2019	438.01
31	Samaspur Bird Sanctuary	03-10-2019	437.41
32	Sambhar Lake	23-03-1990	329.55
33	Sandi Bird Sanctuary	26-09-2019	437.34
34	Sarsai Nawar Jheel	19-09-2019	437.27
35	Sasthamkotta Lake	19-08-2002	374.87
36	Sultanpur National Park	25-05-2021	443.41
37	Sundarban Wetland	30-01-2019	434.95
38	Sur Sarovar	21-08-2020	440.64
39	Surinsar-Mansar Lakes	08-11-2005	386.64
40	Thol Lake Wildlife Sanctuary	05-04-2021	442.91
41	Tso Kar Wetland Complex	17-11-2020	441.52
42	Tsomoriri	19-08-2002	374.87
43	Upper Ganga River	08-11-2005	386.64
44	Vembanad-Kol Wetland	19-08-2002	374.87
45	Wadhvana Wetland	05-04-2021	442.91
46	Wular Lake	23-03-1990	329.55

ENVIS-Resource Partner
Wildlife and Protected Areas
2021
भारतीय वन्यजीव संस्थान
Wildlife Institute of India

7. Source: rsis.ramsar.org

Annexure-3

File No. CGWA-NOCA/4/2020-CGWA
Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Authority

Public Notice No.10/ 2022
New Delhi, Dated 03.11. 2022

Attention - Ground Water Users from these categories: Industrial/ Infrastructure/ Mining Projects/ Drinking & Domestic Use for Residential Apartments/ Group Housing Societies/ Government Water Supply Agencies in Urban Areas/ Bulk Water Suppliers/ Swimming Pool/ Sport Complex/ Govt Office Building, in the States/UTs of Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Rajasthan, Sikkim, Tripura, Uttarakhand, Andaman and Nicobar Islands, Dadra & Nagar Haveli and Daman & Diu.

The deadline for submission of Groundwater NOC applications for already existing projects expired on 30.09.2022. Environmental Compensation (**EC**)/ Late Submission Fee shall to be imposed on Projects that did not apply or did not make efforts to apply by 30.09.2022. **EC** on entire ground water withdrawal quantum shall be imposed **wef 24.09.2020 or Date of Commencement** of Project (as per application/ other documents like CTE/ CTO/ Mine Plan Approval), whichever is later. **Late Submission Fee of Rs 1,00,000/-** shall also be applicable in all such cases alongside EC. EC and Late Fee as above shall **also be applicable in those cases** where earlier application(s) of firm got rejected and the firm did not apply/ did not make efforts to apply before 30.09.2022.

The above applies only to new applications. **Renewal applications** not submitted timely shall be processed as per **Para 11.0(vii)** of Guidelines dated 24.09.2020.

Member Secretary
CGWA

Annexure - 4

SITE INSPECTION PROFORMA FOR VERIFICATION OF COMPLIANCE OF CONDITIONS OF NOC BY INDUSTRIES/ INFRASTRUCTURE/ MINING PROJECTS/ URBAN WATER SUPPLY AGENCIES

1. Name of ground water user
2. Industry/infrastructure/ mining project/ Urban Water Supply agencies (Tick any one)
3. Village/ Block/ District/State: ----------
4. No. & Date of issuance of NOC: ----------
5. Date of latest renewal (if any): ----------
6. Validity of NOC (Years): ----------
7. Date of site inspection : ----------

8. Monitoring of compliance of conditions laid down in the NOC:

S. No.	Conditions as per NOC		Compliance status observed		Remarks
1a	Quantum of ground water withdrawal through abstraction structure (TW/ BW/ DW)	_____m3/day	Quantum withdrawn by the firm (Check log book)	m^3/day	
1b	No. of ground water abstraction structures	DW ----- TW----- BW-----	No. of GW abstraction structures	DW ------ TW------- BW------	
1c	Common outlet point(s) of abstraction structures fitted with digital water flow meter	Common outlet point(s) to be fitted with flow meters	Check at site	Yes/ No	
1d	Functional status of flow meter	All flow meters should be functional	Are all flow meters in working condition ?	Yes/ No	
2a*	Quantum of Dewatering of Groundwater (In case of mine/ infrastructure dewatering projects)	_____ m^3/day	Quantum of dewatering withdrawn by the firm (Check log book)	m^3/day	

S. No.	Conditions as per NOC		Compliance status observed		Remarks
2b*	No. of Mine pits/ sump/ dewatering structure	_____	No. of Mine pits/ sump/ dewatering structure constructed		
2c*	Common outlet point(s) of dewatering structures fitted with digital water flow meter	All common outlet point(s) connected to dewatering structures to be fitted with digital water flow meters	Check at site	Yes/ No	
3	Submission of data on GW extraction/ dewatering to CGWA	GW extraction/ dewatering data to be submitted to CGWA	Whether ground water extraction/ dewatering data submitted to CGWA	Yes/ No. Month up to whic h data submitted :	
4a	No. of piezometers to be constructed	_____	No. of piezometers constructed	_____	
4b	a) No. of piezometers to be fitted with AWLR/DWLR b) No. of piezometers to be fitted with telemetry	a) _ b)___	a) No. of piezometers fitted with AWLR/DWLR b) No. of piezometers fitted with telemetry	a)_____ b) _____	Attach photographs
4c	Submission of water level data to CGWA	Monthly WL data to be submitted	Whether monthly water level data submitted to Regional Office	Yes/ No Month/ Year up to which data submitted:	
5	Monitoring of GW quality	GW quality to be monitored	Whether quality data submitted to Regional Office	Year up to which data submitted :	
6a	No. of wells to be monitored around the mining area	Both in core and buffer zone	No. of wells monitored around the industry	Core : Buffer :	

S. No.	Conditions as per NOC		Compliance status observed		Remarks
6b	Submission of water level data of core and buffer zone	Pre- and post – monsoon data	Whether water level data of wells monitored submitted to Regional Office	Yes/ No	
7a	Annual quantum of water to be harvested/ recharged (As per NOC issued prior to 24.09.2020)	_____m^3/ annum	Quantum of water harvesting/ recharge as implemented by the firm	_____ m^3/annum	
7b			No. and type of recharge structures implemented inside the premises (Attach photographs)		
			Whether structures are maintained properly	Yes/ No	
7c			No. and type of structures implemented outside the premises (Attach photographs)		
			Locations of structures		
			Whether All the structures are maintained properly	Yes/ No	
8	Recycling/ reuse of water		Check at site the STP/ETP installed (Attach photographs)	Yes/ No	

9*	Water from dewatering in mining/ infrastructure projects to be put to gainful use		Activity for which water from dewatering project is being used		

*Applicable for Mining/Infrastructural dewatering projects only.

Name & signature of Project proponent/ Representative of the firm

Name & signature of Inspecting Officer officer from Regional Office

10. Status of Compliance of NOC Conditions: Fully/ Partially/ Non-Compliance

11. Valid reasons for non-compliance, if any :

12. Whether action is to be initiated against the industry? : Yes / No

13. Details of Action Taken at the level of Regional Director :

14. Date of issuing Show Cause Notice:

15. Follow – up actions taken/ recommended, if any:

Recommendation of Regional Director : Recommended for renewal (Yes/ No)

Name & Signature of Regional Director with stamp:

Annexure - 5

(Sample show cause notice in case self compliance / inspection has not been filed by proponent)

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

CENTRAL GROUND WATER AUTHORITY
[Constituted under section 3 (3) of Environment (Protection) Act, 1986]

(Address of Regional Office)
(Email ID of Regional Office)

File No. _____ **Date: _____**

SHOW-CAUSE NOTICE

Whereas the Central Ground Water Authority, in exercise of its powers under sub-section(2) of section 3 has issued No objection certificate (NOC) with mandatory conditions/ restrictions and safeguard vide File No. ……., dated ..... with a specific time frame for submitting intimation regarding compliance of conditions.

And whereas a review of the status of submission of intimation regarding compliance of conditions as specified in the NOC has revealed that Your Unit has been found not to have complied with the directions for submitting compliance report as specified in the NOC mentioned above, warranting action as per provisions of Environmental (Protection) Act,1986 for violation of conditions of NOC.

Now, therefore, the Authority, in exercise of powers under section 5 of the Environment (Protection) Act, 1986, hereby directs you to show cause as to why the NOC issued to your Industry/ Project/ Firm should not be cancelled and a complaint against your Industry/ Project/ Firm should not be registered with National Green Tribunal under Section 15 and 16 of the Environmental (Protection) Act, 1986 for violation of condition of the NOC. You are hereby given an opportunity to furnish intimation regarding action taken for compliance of the conditions specified in the NOC within 21 days of receipt of this notice, failing which the Authority shall proceed against you as per law, at your own risk, cost and responsibility including imposition of penalty and withdrawal/ cancellation of the NOC.

(Signature**)**

(Name of the issuing officer**)**
Designation

To

Industry/Project Proponent (By Name)

……
……
……

Copy to:

1. Collector/Deputy Commissioner/District Magistrate ……,
2. Member Secretary, State Pollution Control Board concerned.

ACKNOWLEDGEMENT

Received the Show-Cause-Notice dated …… from the Authorized Officer of Central Ground Water Authority on ……

A reply to the Show Cause Notice is enclosed/Compliance Report will be submitted along with photographs latest by ……...

For Industry/Project

Authorized Signatory

Annexure -6

(Sample show cause notice in case of non compliance of NOC conditions observed during site inspection)

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

CENTRAL GROUND WATER AUTHORITY
[Constituted under section 3 (3) of Environment (Protection) Act, 1986]

(Address of Regional Office)
(Email ID of Regional Office)

File No. _____ Date: _____

SHOW–CAUSE-NOTICE

Whereas Central Ground Water Authority, in exercise of its powers under sub-section(2) of section 3 has issued No objection certificate (NOC) with mandatory conditions/ restrictions and safeguard vide **File No. ……., dated .....……..** with a specific time frame for compliance of conditions.

And whereas, the Authority in exercise of its powers and functions under clause (x) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 had ordered inspection of your unit to check the status of NOC/compliance of conditions of NOC/Guidelines. A copy of the Inspection Report is enclosed herewith.

And whereas, during the course of inspection, your Unit has been found to have contravened by not complying with the mandatory conditions of NOC as mentioned below warranting action as per the provisions of Environment (Protection) Act, 1986 and for violation of conditions of NOC/Guidelines.

(Specify the condition/ conditions that has/ have not been complied with)

Now therefore, the Authority in exercise of powers under section 5 of the Environment (Protection) Act, 1986 hereby directs you to show cause as to why a complaint against your Industry/Project/Unit should not be registered under section 15 of the Environment (Protection) Act, 1986 with National Green Tribunal/Environmental Court for violation of conditions of the NOC. You are hereby given an opportunity to rectify the default/ contravention immediately, in any case not later than 60 days from the date of receipt of this notice, failing which the Authority shall proceed against you as per law, at your own risk, cost and responsibility, including withdrawal/ cancellation of NOC and imposition of penalty.

(Signature**)**

(Name of the issuing officer**)**
Designation

To

Industry/Project Proponent (By Name)

……

Copy to:

1. Collector/ Deputy Commissioner/ District Magistrate ……,

2. Member Secretary, State Pollution Control Board concerned.

ACKNOWLEDGEMENT

Received the Show-Cause-Notice dated …… from the Authorized Officer of Central Ground Water Authority on ……

A reply to the Show Cause Notice is enclosed/Compliance Report will be submitted along with photographs latest by ……...

For Industry/Project

Authorized Signatory

Annexure -7

(Sample show cause notice in case of furnishing false information on ground water withdrawal by mines)

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

CENTRAL GROUND WATER AUTHORITY
[Constituted under section 3 (3) of Environment (Protection) Act, 1986]

(Address of Regional Office)
(Email ID of Regional Office)

File No. _____ Date: _____

SHOW–CAUSE-NOTICE

Whereas, the Authority has issued 'Guidelines to control and regulate ground water extraction in India' vide notification number 3289(E) dated 24th September, 2020, according to which "Proponents shall pay Ground Water Abstraction/ Restoration Charges based on quantum of ground water extraction as applicable as per the rates given in Section 6."

And whereas, during the processing stage of your NOC Application, the Authority had received a request for significant reduction of the quantum of dewatering and NOC was issued for the reduced quantum.

And whereas a site-inspection report has been received from (name and designation of inspecting officer) which indicates that initial quantum for which permission was asked for was close to actual dewatering requirement and was later reduced to avoid or minimise ground water abstraction/ Restoration charges as mentioned below-:

Name of project	**Dewatering Volume (m3/Day)** **(Pre-monsoon/ Post-monsoon Period)**	**NOC Dewatering Volume (m3/Day)**	**Application Dewatering Volume (m3/Day)**
……..	……..	…….	……..
	……		

And whereas, it has come to the notice of Authority that not only you have contravened the NOC conditions as the actual dewatering quantum by your project exceeds the dewatering volume mentioned in the issued NOC, but you have also misled the Authority by providing false and incorrect information with a view to deceive the Authority. This malafide intention with intent to evade payment of charges and willful concealment / suppression of material information is considered as a serious transgression by this Authority.

Now therefore, in view of the above and in exercise of the powers vested under Section 5 of the Environmental (Protection) Act, 1986, the authority hereby directs you to show cause as to why the NOC issued to your project should not be cancelled and legal action against your industry/project should not be initiated as per law which may include sealing of borewell, suspension/ closure of your unit, levying of Environmental Compensation and invoking penal provisions under section 15 of the Environment (Protection) Act.

You are hereby given an opportunity to submit your response, in any case within 15 days of receipt of this notice, failing which appropriate strict action will be initiated against your project, at your own risk, cost and responsibility for illegal withdrawal of groundwater. Please note that failure to submit a response will be understood that you have nothing to say in your defense.

(Signature**)**

(Name of the issuing officer**)**
Designation

To

Project Proponent
……
……
……

Copy to:

1. Collector/Deputy Commissioner/District Magistrate ……,
2. Member Secretary, State Pollution Control Board concerned.

ACKNOWLEDGEMENT

Received the Show-Cause-Notice dated …… from the Authorized Officer of Central Ground Water Authority on ……

A reply to the Show Cause Notice is enclosed/Compliance Report will be submitted along with photographs latest by ……...

For Industry/Project

Authorized Signatory

Annexure -8

(Sample show cause notice in case of non submission of renewal application)

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

CENTRAL GROUND WATER AUTHORITY
[Constituted under section 3 (3) of Environment (Protection) Act, 1986]

(Address of Regional Office)
(Email ID of Regional Office)

File No. _____ Date: _____

SHOW–CAUSE-NOTICE

Whereas the Authority has issued 'Guidelines to control and regulate ground water extraction in India' vide notification number 3289(E) dated 24th September, 2020, wherein Section 11 (i) provides that "The applicant shall apply for renewal of No Objection Certificate at least ninety days prior to expiry of its validity."

And whereas, the said Guidelines further provide under Section 11 (vii) that "If the proponent fails to apply for renewal within 3 months from the date of expiry of No Objection Certificate, the proponent shall be liable to pay Environmental Compensation for the period starting from the date of expiry of No Objection Certificate till No Objection Certificate is renewed by the competent authority."

And whereas, it has come to the notice of Authority that your NOC (No……..…….… dated ----------) has expired on ……... The process of renewal of No Objection Certificate for ground water abstraction by your industry/project is overdue and the proponent has failed to apply for renewal within the stipulated time.

Now therefore, in view of the non compliance observed above and in exercise of the powers vested under Section 5 of the Environmental (Protection) Act, 1986 and Gazette Notification, S.O. 3289(E) dated 24/9/2020, the authority hereby directs you to show cause to explain the reason as to why legal action should not be initiated against your industry/project as per law which may include sealing of borewell, suspension/ closure of your unit and levying of Environmental Compensation for the period starting from the date of expiry of NOC till its renewal.

You are hereby given an opportunity to submit your response, in any case within 15days of receipt of this notice, failing which appropriate action will be initiated against your industry/project under the provisions of Environmental (Protection) Act, 1986 and Gazette Notification S.O. 3289(E), dated 24/9/2020, at your own risk, cost and responsibility for illegal withdrawal of groundwater. Please note that failure to submit a response will be understood that you have nothing to say in this regard.

(Signature)

(Name of the issuing officer)
Designation

To

Project Proponent
……
……

……

Copy to:

1. Collector/Deputy Commissioner/District Magistrate ……,
2. Member Secretary, State Pollution Control Board concerned.

ACKNOWLEDGEMENT

Received the Show-Cause-Notice dated …… from the Authorized Officer of Central Ground Water Authority on ……

A reply to the Show Cause Notice is enclosed/Compliance Report will be submitted along with photographs latest by ……..

For Industry/Project

Authorized Signatory

Annexure- 9

(Sample show cause notice in case of ground water withdrawal without NOC)

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation

CENTRAL GROUND WATER AUTHORITY
[Constituted under section 3 (3) of Environment (Protection) Act, 1986]

(Address of Regional Office)
(Email ID of Regional Office)

File No. _____ Date: _____

SHOW–CAUSE-NOTICE

Whereas the Central Ground Water Authority has issued public notices directing all the existing ground water users to apply for No Objection Certificate for ground water withdrawal.

And whereas, it has been brought to the notice of Authority that**……..** is withdrawing ground water without obtaining NOC from the Authority.

Now therefore, the Authority in exercise of powers under section 5 of the Environment (Protection) Act, 1986 hereby directs you to show cause as why your ground water abstraction structure(s) (dugwell/borewell/tubewell/ dewatering structure) should not be sealed for illegal withdrawal of ground water. You are hereby given an opportunity to submit explanation within 15 days from the date of receipt of this notice, failing which the authority shall proceed in accordance with law, at your own risk, cost and responsibility including sealing of ground water abstraction structures and imposition of environmental compensation for illegal withdrawal of groundwater.

(Signature**)**

(Name of the issuing officer**)**
Designation

To

Project Proponent
……
……
……

Copy to:

1. Collector/Deputy Commissioner/District Magistrate ……,
2. Member Secretary, State Pollution Control Board concerned.

ACKNOWLEDGEMENT

Received the Show-Cause-Notice dated …… from the Authorized Officer of Central Ground Water Authority on ……

A reply to the Show Cause Notice is enclosed/Compliance Report will be submitted along with photographs latest by ……..

For Industry/Project

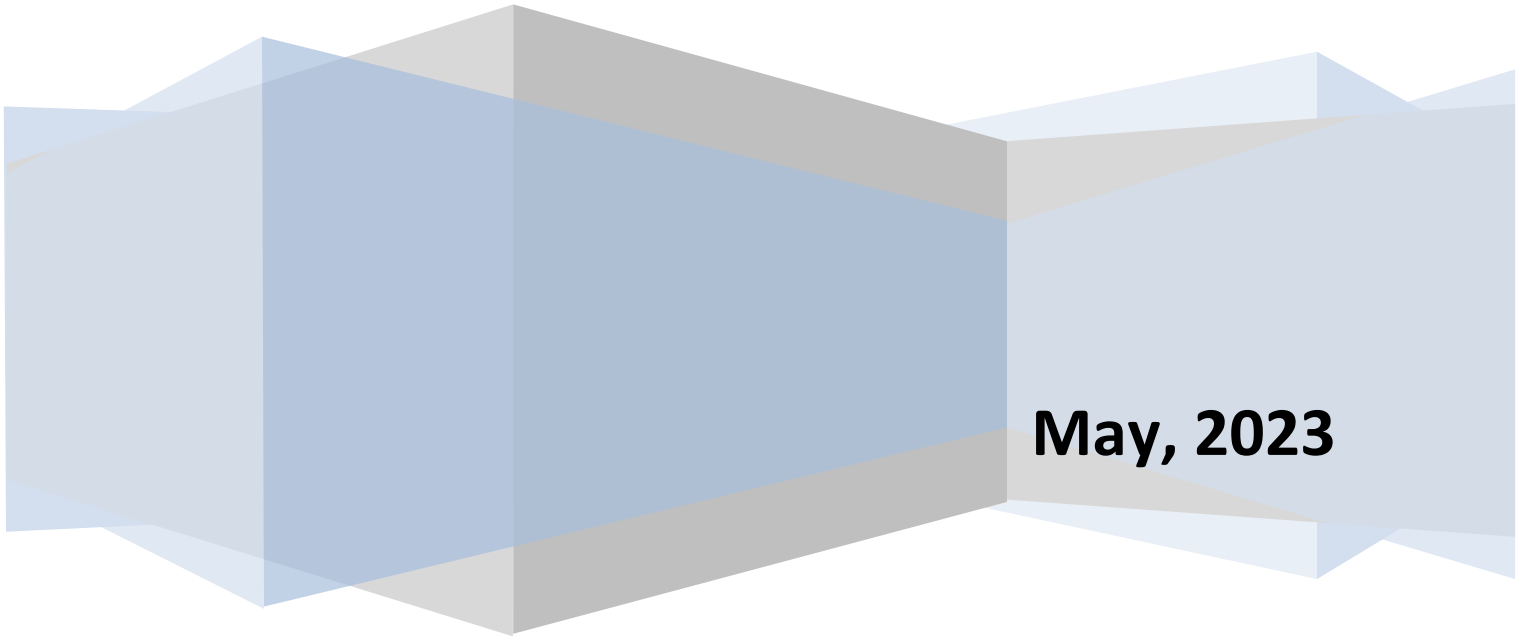
Authorized Signatory

APPENDIX-A

MINISTRY OF JAL SHAKTI,
CENTRAL GROUND WATER AUTHORITY

Standard Operating Procedures

Impact Assessment Report and Comprehensive Hydrogeological Report



May, 2023

Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation Central Ground Water Authority

Standard Operating Procedures for preparation of Impact Assessment Report and Comprehensive Hydrogeological Report

CONTENTS

Tables

I PURPOSE OF THIS DOCUMENT

The main objective of the accreditation of the Groundwater Professionals and Institutions is to ensure that reports of acceptable standards are submitted by them for obtaining NOC from CGWA. During the last one year, it has been observed that despite the clear instructions mentioned in the guidelines as well as comments/ suggestions offered during the meetings of Expert Appraisal Committee, instructions/suggestions given to the consultants/Institutions in the special meetings organized with them and also after the scrutiny of reports, the quality of the reports is not up to the acceptable standards. This requires interventions from CGWA side and a lot of time is elapsed in scrutiny of reports. In order to facilitate the consultants/institutions in preparation of the Impact Assessment Report (IAR) and Comprehensive Report (CR) on ground water conditions in both core and buffer zones for Mining Projects this SOP has been prepared. This document provides guidance and a consistent, structured approach for preparation of a IAR and CR report in support of their proposal for NOC application.

IAR must be prepared by an **Accredited Consultant/Institution (AC) only**. **Also an AC can prepare a report only if the work order by the project proponent is issued to him/her/ institution.** The AC shall digitally sign and stamp a completed report which is submitted to the CGWA, and shall take professional responsibility for its content and the accuracy of the information contained therein. For issues of professionalism and data integrity, the AC is directed to follow the guidelines and codes of ethics maintained by the Policy Document of the **Accredited Consultant/Institutions**.

II PURPOSE OF SUBMISSION OF REPORTS

The objective of submission of the said reports was in line with the Hon'ble NGT directions wherein it was directed that there should be "no general permission for withdrawal of ground water, particularly to any commercial entity, without environment impact assessment of such activity on individual Assessment units in cumulative terms covering carrying capacity aspects by an expert committee".

All Impact Assessment Reports should include necessarily following aspects:

i. Changes in water table elevation (including seasonal fluctuations)
ii. Changes in groundwater flow direction
ii. Reduction to infiltration/recharge/discharge rates and volumes on varying time scales (i.e., daily to annual depending upon proximal environmental features)
iv. Change in baseflow (quantity and quality)
v. Impact on water quality
vi. Impact on nearby surface water bodies (wetlands, water courses or other significant features)

Thus, the purpose of the submission of the hydrogeological reports is to evaluate the potential for unacceptable impacts to occur as a result of the water withdrawal. The report must also propose contingency and mitigative measures that will be implemented in the event that unforeseen unacceptable impacts occur. It has been observed that most of the reports lay emphasis on the chapters other than the hydrogeology, aquifer carrying capacity and impact assessment. As such these reports do not serve the desired purpose and it takes a lot of time and effort in getting them in order. Also, the Maps and Charts prepared by such consultants are not in conformity with the standards prescribed by the international systems of symbology leading to different formats of figures and charts.

A FORMAT FOR IMPACT ASSESSMENT REPORT

The **level of detail** required in the hydrogeological study is normally expected to be commensurate with the level of risk posed by the withdrawal of ground water by the industry/ infrastructure dewatering project, and level of uncertainty of the available information. In the report, the AC should provide clear rationale for the level of work performed and the methodology or study approach utilized. The consultant is expected to undertake field work to collect the requisite information from the field. If need be secondary data of Central/ State agencies may also be collected.

The AC should ensure that GW withdrawal may not cause irreversible impacts to the aquifer such as those that may occur if a confined aquifer is over-pumped. In addition, the withdrawal of ground water should not normally result in deterioration of quality of ground water on a neighbouring property. Even if the hydrogeological study demonstrates that there will not be any unacceptable impacts, the report must propose **contingency and mitigative measures** that will be implemented in the event of unforeseen unacceptable impacts.

Wherever feasible, the ministry encourages that water should be recycled and reused and should be **returned to its source** in order to conserve ground water resources. The study must also address the physical and water quality impacts to the natural environment that may result from a **discharge of the effluent on the Ground Water System**.

CHECK LIST FOR PP BEFORE SUBMISSION OF IAR/ CHR

(Please note** that **failure to adhere** to below-given basic norms of report writing will result in **return** of IAR/ CHR **without** further **scrutiny** for **resubmission)

S. No.	To Check	Yes/ No
1.	Whether Month and Year of submission of report is mentioned on Front Page	
2.	Whether Version of report (if revised) mentioned on Front Page	
3.	Whether groundwater quantum in report matches with NOC application	
4.	Whether all salient features have been entered in the Table (Chapter-1).	
5.	Whether Accreditation Certificate has been attached.	
6.	Whether Work Order or relevant document having proof of date of Work Order has been attached.	
	Whether all sections as per report SoP have been covered (even if certain	

	section is not deemed relevant, same should also be inserted in the text with comment like not required/ not applicable etc. with reason)	
7.	Whether Water Level maps have colour zoning as per SoP for report	
8.	Whether all figures in the report have been referred to/ discussed in text with Figure No.	
9.	Whether all tables in the report have been referred to/ discussed in text with Table No.	
10.	Whether all Maps have good resolution with Scale, Coordinates, North and Legend and whether legend is legible.	
11.	Whether source of data (in tables/ values etc.) taken from elsewhere (i.e Secondary Data) has been quoted in the text/ below the table.	
12.	Whether details of references cited in text/ source of data have been given at the end of report as Bibliography.	
13.	Whether all certificates/ documents bearing signatures (such as Work Order, Certificate by Consultant etc.) have the name of signatory below signature.	

Note*: *It may be noted that merely following above does not amount to report being complete or in-order. Further scrutiny will only be done if report is submitted adhering to above norms.

Signature with Name

1. SALIENT FEATURES OF THE PROPOSAL

S. No.	Particulars	Information
1.	Application No.	
2.	Submission Date	
3.	Fresh or Renewal	
4.	Existing or New/ Proposed	
5.	If Renewal, date of validity of existing/ last NOC	
6.	CTE Issue Date	
7.	Name of Project with Address	
8.	State	
9.	District	
10.	Block/ Taluka	
11.	Category of Block/ Taluka (as per prevailing GWRE)	
12.	Quantum of GW applied (KLD)	
13.	Quantum of GW applied (m^3/Year)	
14.	Alluvium/ Non-alluvium	
15.	GW Modelling Required (Yes/ No)	
16.	Name of Authorized Signatory of Project & Designation	
17.	Consultant Details with Name of Authorized Signatory (If Institution)	
18.	In case report is prepared jointly by accredited institute and individual consultant, name details of chapters prepared by the individual consultant	
19.	Accreditation Certificate No. and Date/ Validity (In case jointly as per Point No. 14, No. and validity of both institution and individual are to	

	be given)	

Signature with Name

2. ABOUT THE PROJECT

This section should identify and briefly describe the general location {Industrial belt, Block, District, State, coordinates} of the project, and intended use of the ground water withdrawal {Whether Existing or Proposed}, duration of study conducted and outline the scope of work performed. Project area and 5 Km radius/Square shall be demarcated on google map.

2.1 LANDUSE/ LAND COVER OF THE SURROUNDING AREA

This sub section will deal with the description and map of Landuse/ Land cover map of the area covering 5 km radius from the plant site.

2.2 DEM / TOPOGRAPHY

This subsection will deal with the topography of the surrounding area within 5 km radius from the plant site giving the details of elevation of the surrounding area. DEM and. or topographic contour map of the area within 5 km radius shall be given here.

2.3 GEOMORPHOLOGY AND DRAINAGE 5 KM (RADIUS/SQUARE)

This sub section will describe the geomorphology and drainage of the area and the text will be supported by Geomorphology and drainage maps.

2.4 DETAILS OF WETLANDS/ MAJOR WATER BODIES

This sub section will give the details of wetlands/ major water bodies if any within the 5 km radius and give information on distance/ direction of the plant site from the designated wetland.

If the project site is within 500 metres from the designated wetland as per Ramasar Convention (list of sites available on the NOCA P porta), detailed proposal to avoid/ mitigate the adverse impact on the wetland due to the ground water withdrawal shall be furnished.

HYDROGEOLOGY

3.1 GEOLOGICAL SETUP

This should include area specific geology and will contain information and maps of both regional Geology and the local Geology of the area within 5 km radius (Circle/ square) of the plant site. The maps should be based on GSI or field investigation data}.

3.2 HYDROGEOLOGICAL SETUP

The purpose of the GW survey is to collect baseline data that can help prevent and resolve interference complaints. The focus is on gathering current information about the existing hydrogeological conditions. Enhanced monitoring of wells may be performed where the focus would be on impacts that occur as a result of water withdrawal.

This section will deal with the ground water situation in and around the project area including water level and quality data and maps along with quality issues, if any.

Hydrogeological map of the area covering 5 km radius from the plant site showing the aquifers available in the area and ground water table elevation contours and flow direction shall be given.

3.2.1. Aquifer characteristics

Information on type of aquifers, depth, thickness, porosity, permeability and storativity etc. shall be furnished in this sub section.

3.2.2. Ground water flow and aquifer interaction with surface water bodies

Information on ground water flow and details of ground water - surface water interconnection, if any, observed in the area shall be furnished.

3.2.3 Depth to water level

The consultants are supposed to measure water level in the study area, i.e. 5 KM radius/square in case of Industry/ infrastructure dewatering projects. Few wells can also be monitored outside the study area to extend the interpolations outside the study area. There should be at least 5-6 observation wells within the 5 Km radius study area and 3-4 outside the study area to be used for control points of water level & water table covering all directions. Water level data should not be collected during monsoon season (June - September).

This sub section shall give data on depth to ground water level (metres below ground level) collected from the field. Depth to water level map shall be prepared based on the data collected from the field. Depth to water level maps of pre-monsoon and post-monsoon seasons and also seasonal water level fluctuation map based on secondary data available shall also be incorporated in the report. These maps will also incorporate the primary data collected by the consultant, if the period of data collection coincides with the pre-monsoon/ post-monsoon. Season (pre-monsoon/ post-monsoon)/ month and year of data should be clearly mentioned on the maps.

3.2.4 Long term water level data analysis

This sub section will deal with the decadal water level trend analysis of both pre – monsoon and post – monsoon {based on State/CGWB data located within 5 km from project site and tapping same aquifer}. Hydrographs (line diagrams) of decadal water level data during pre-monsoon and post-monsoon seasons of a few select monitoring wells of Central/ State Government agencies showing the trend of water level variation should be given here.

3.2.5 Ground Water quality

This sub section will deal with the quality of ground water and shall include maps of electrical conductivity as contour and other Industry specific parameter as per the Annexures. Samples need to be collected by the consultant from the area covering 5 km radius of the plant site. No samples should be collected during monsoon season (June - September). Locations of samples may also be shown on the map. Samples should be analysed by NABL accredited laboratories only. The month and year of data collection may be mentioned on the map. Minimum of 6-7 samples may be collected from the study area and 2 -3 samples from outside the study area.

3.2.6 Water quality of nearby water bodies

Water samples from the nearby water bodies, if any, present in the study area should be collected and analysed from NABL accredited laboratory. Data should be presented and discussed here.

4. DETAILS OF PROPOSED/ EXISTING TUBEWELLS/ BOREWELLS

This includes the table showing aquifer wise parameters, drilling depth, diameter, lithological log, details of pump lowered/ proposed to be lowered, H.P. of pump, well discharge (lps/Cub m/day) etc.

5. PROPOSED DEWATERING PLAN IN CASE OF INFRASTRUCTURE DEWATERING PROJECTS

5.1 PLAN FOR DEWATERING

This sub section will deal with the estimation of per day quantum of seepage that needs to be dewatered and clearly indicating the expected maximum depth from where dewatering will be done and specific period for which dewatering will be needed.

5.2 USAGE OF PUMPED WATER

This sub section will describe the proposed usage of pumped water for various uses like drinking, irrigation, recharge, runoff to the stream/ drain or any other use.

6. IMPACT ASSESSMENT

6.1 IMPACT ON THE GROUND WATER REGIME

This section will cover risks of the GW environmental degradation due to GW abstraction including likely impacts of proposed GW Withdrawal on surrounding area in next five years period, affected area and radius of influence.

6.2 IMPACT ON SURFACE WATER SOURCES

This section deals with impact of GW abstraction on the nearby surface water bodies & potential threats if any.

6.3 IMPACT ON WATER QUALITY

Impact of GW abstraction on the GW and SW quality regime.

6.4 MITIGATION MEASURES

Water conservation measures adopted/ proposed to be adopted to reduce/ reuse/save ground water need to be described here. Also measures for treatment of waste water and disposal of waste water by Industry may be furnished.

6.5 SALINE WATER DISPOSAL STRATEGIES (IN CASE OF SALINE WATER ABSTRACTION)

Brief details of technology and method to be adopted for disposal of reject/saline water and likely impact on surrounding water quality may be furnished in this section.

6.6 GW MODELLING

(To be included as per SOP given below (**Part D**), if applicable)

7. WATER BALANCE, RECYCLE AND REUSE

This section will include brief write up on water requirement giving water balance including details of water required in the industrial process showing the make up water and blow down from the boiler/ cooling tower etc. along with the details of recycled water. This will also include details on capacity and flow chart of Sewage Treatment Plants / Effluent Treatment Plants / Combined Effluent Treatment Plants existing/ proposed within the project, details of water conservation measures to be adopted to reduce/ save the ground water and water balance with chart showing the usage of water for various processes.

8. SALINE WATER DISPOSAL STRATEGIES (IN CASE OF SALINE GW ABSTRACTION)

Brief details of technology and method to be adopted for disposal of reject/saline water and likely impact on surrounding water quality. Also measures adopted/ suggested to protect the ambient ground/ surface water resources against pollution should be mentioned here.

9. ANY OTHER DETAILS PERTAINING TO THE PROJECT

10. SUMMARY AND CONCLUSION

This chapter must categorically include discussion on likely impact and mitigation measures.

11. BIBLIOGRAPHY

Details of references cited and data sources are to be given.

12. ACCREDITATION CERTIFICATE

Accreditation Certificate may be attached in the report.

B FORMAT FOR COMPREHENSIVE HYDROGEOLOGICAL REPORT ON GROUND WATER CONDITIONS IN BOTH CORE AND BUFFER ZONES FOR MINING PROJECTS

CHECK LIST FOR PP BEFORE SUBMISSION OF IAR/ CHR

(Please note** that **failure to adhere** to below-given basic norms of report writing will result in **return** of IAR/ CHR **without** further **scrutiny** for **resubmission)

S. No.	To Check	Yes/ No
1.	Whether Month and Year of submission of report is mentioned on Front Page	
2.	Whether Version of report (if revised) mentioned on Front Page	
3.	Whether groundwater quantum in report matches with NOC application	
4.	Whether all salient features have been entered in the Table (Chapter-1).	
5.	Whether Accreditation Certificate has been attached.	
6.	Whether Work Order or relevant document having proof of date of Work Order has been attached.	
	Whether all sections as per report SoP have been covered (even if certain section is not deemed relevant, same should also be inserted in the text with comment like not required/ not applicable etc. with reason)	
7.	Whether Water Level maps have colour zoning as per SoP for report	
8.	Whether all figures in the report have been referred to/ discussed in text with Figure No.	
9.	Whether all tables in the report have been referred to/ discussed in text with Table No.	
10.	Whether all Maps have good resolution with Scale, Coordinates, North and Legend and whether legend is legible.	
11.	Whether source of data (in tables/ values etc.) taken from elsewhere (i.e Secondary Data) has been quoted in the text/ below the table.	
12.	Whether details of references cited in text/ source of data have been given at the end of report as Bibliography.	
13.	Whether all certificates/ documents bearing signatures (such as Work Order, Certificate by Consultant etc.) have the name of signatory below signature.	

Note*: *It may be noted that merely following above does not amount to report being complete or in-order. Further scrutiny will only be done if report is submitted adhering to above norms.

Signature with Name

1. SALIENT FEATURES OF THE PROPOSAL

S. No.	Particulars	Information
1.	Application No.	
2.	Submission Date	
3.	Fresh or Renewal	
4.	Existing or New/ Proposed	
5.	If Renewal, date of validity of existing/ last NOC	
6.	CTE Issue Date	
7.	Name of Project with Address	
8.	State	

9.	District	
10.	Block/ Taluka	
11.	Category of Block/ Taluka (as per prevailing GWRE)	
12.	Quantum of GW applied (KLD)	
13.	Quantum of GW applied (m^3/Year)	
14.	Alluvium/ Non-alluvium	
15.	GW Modelling Required (Yes/ No)	
16.	Name of Authorized Signatory of Project & Designation	
17.	Consultant Details with Name of Authorized Signatory (If Institution)	
18.	In case report is prepared jointly by accredited institute and individual consultant, name details of chapters prepared by the individual consultant	
19.	Accreditation Certificate No. and Date/ Validity (In case jointly as per Point No. 14, No. and validity of both institution and individual are to be given)	

Signature with Name

2. ABOUT THE PROJECT

This section should identify and briefly describe the general location {Block/ taluka/ tehsil, District, State, coordinates} of the project, whether Existing or Proposed, duration of study conducted and outline the scope of work performed. Project site, core zone of 2 km radius and buffer zone of 10 Km radius/Square shall be demarcated ongoogle map.\

2.1 LANDUSE/ LAND COVER OF THE SURROUNDING AREA

This sub section will deal with the description and map of Landuse/ Land cover map of the area core and buffer zones.

2.2 DEM/ TOPOGRAPHY

This subsection will deal with the topography of the core and buffer zones of the project site giving the details of elevation of the surrounding area. DEM and/ or topographic contour map of the area within 2 and 10 km radii shall be given here.

2.3 GEOMORPHOLOGY AND DRAINAGE

This sub section will describe the geomorphology and drainage of the area and the text will be supported by Geomorphology and drainage maps.

2.4 DETAILS OF WETLANDS/ MAJOR WATER BODIES

This sub section will give the details of wetlands/ major water bodies if any in the core and buffer zones and give information on distance/ direction of the project site from the designated wetland. If the project site is within 500 metres from the designated wetland as per Ramsar Convention (list of sites available on the NOCAP portal), detailed

proposal to avoid/ mitigate the adverse impact on the wetland due to the ground water withdrawal shall be furnished.

3. HYDROGEOLOGY

3.1 GEOLOGICAL SETUP

This should include area specific geology and will contain information and maps of both regional Geology and the local Geology of the core zone covering area within 2 km radius and buffer zone covering 10 km radius (Circle/ square) from the project site. The maps should be based on GSI or field investigation data.

3.2 GEOPHYSICAL STUDIES

This sub section will include details of Geophysical investigations including vertical electrical soundings carried out in and around the project area, and their analysis.

3.3 HYDROGEOLOGICAL SETUP

The purpose of the GW survey is to collect baseline data that can help prevent and resolve interference complaints. The focus is on gathering current information about the existing hydrogeological conditions. Enhanced monitoring of wells may be performed where the focus would be on impacts that occur as a result of ground water withdrawal.

This section will deal with the ground water situation in and around the project area including water level and quality data and maps along with quality issues, if any. Hydrogeological map of the area covering core and buffer zones within 2 km and 10 km radii from the project site showing the aquifers available in the area and ground water table elevation contours and ground water flow direction shall be given.

3.3.1. Aquifer characteristics:

Information on type of aquifers, depth, thickness, porosity, permeability and storativity etc. shall be furnished in this sub section.

3.3.2. Ground water flow and aquifer interaction with surface water bodies:

Information on ground water flow and details of ground water - surface water interconnection, if any, observed in the area shall be furnished.

3.3.3 Depth to water level

The consultants are supposed to measure water level in the study area, i.e core zone of 2 KM and buffer zone of 10 KM radius/square. Few wells can also be monitored outside the study area to extend the interpolations outside the study area. There should be at least 10- 12 observation wells within the 10 Km radius study area and 4-5 outside the study area to be used for control points of water level & water table covering all directions. Water level data should not be collected during monsoon season (June - September).

This sub section shall give data on depth to ground water level (metres below ground level) collected from the field. Depth to water level map shall be prepared based on the data collected from the field. Depth to water level maps of pre-monsoon and post-monsoon seasons and also seasonal water level fluctuation map based on secondary data

available shall also be incorporated in the report. These maps will also incorporate the primary data collected by the consultant, if the period of data collection coincides with the pre-monsoon/ post-monsoon. Season (pre-monsoon/ post-monsoon)/ month and year of data should be clearly mentioned on the maps.

3.3.4 Long term water level data analysis

This sub section will deal with the decadal water level trend analysis of both pre – monsoon and post – monsoon {based on State/CGWB data located within 10 km from project site and tapping same aquifer}. Hydrographs (line diagrams) of decadal water level data during pre-monsoon and post-monsoon seasons of a few select monitoring wells of Central/ State Government agencies showing the trend of water level variation should be given here.

3.3.5 Ground water quality

This sub section will deal with the quality of ground water and shall include maps of electrical conductivity as contour and other parameters as point value. Samples need to be collected by the consultant from the core and buffer zones. Locations of samples may also be shown on the map. Samples should be analysed by NABL accredited laboratories only. The month and year of data collection may be mentioned on the map. Minimum of 12-13 samples may be collected from the study area and 2 -3 samples from outside the study area.

3.3.6 Water quality of nearby water bodies

Water samples from the nearby water bodies, if any, present in the study area should be collected and analysed from NABL accredited laboratory. Data should be presented and discussed here.

4. APPROVED MINE PLAN

This includes the Year wise mine plan including excavation depth, area and mine seepage KLD and KLY based on volume of excavation, permeability, GW Gradient around mine pit(s).

5. ESTIMATION OF MINE SEEPAGE, RAINWATER QUANTUM DEWATERED (IN CASE OF OPEN CAST MINES) AND ADVANCED DEWATERING PLAN

Type of mine (Open Cast/Underground)

Elevation of water table,mine pits

Details of Mine pit and tunnel (number of pits and tunnels with dimensions(Length, width,depth)

5.1 ESTIMATION OF MINE SEEPAGE

Mine seepage should be calculated for 5 years as per approved mining plan.The details of calculated mine seepage is given below. Seepage calculations shall be made Pit Wise/Tunnel/Shaft.

Table 5.1: Seepage from Walls of the Pit/Tunnel

Year	Period	Working bench Reduce Level in respect to MSL (m)	Depth to Water RL (m)	Length of the Face (m)	Width of the Face (m) or Dia (m) in case of tunnel	Saturated Thickness (m)	GW Gradient (m/m)	*Hydraulic Conductivity (m/day)	Per Day Mine Seepage (Cub m/Day)	Annul Mine Seepage (Cub m/Year)
Year 1	Pre monsoon									
	Post monsoon									
Year 2	Pre monsoon									
	Post monsoon									
Year 3	Pre monsoon									
	Post monsoon									
Year 4	Pre monsoon									
	Post monsoon									
Year 5	Pre monsoon									
	Post monsoon									

The seepage may be estimated from the bottom of the mine pit and be added to the seepage from walls as calculated above.

Table 5.2 Seepage from Bottom of the Pit

Year	Perion	*Hydraulic Conductivity (m/day)	Per Day Mine Seepage (Cub m/Day)	Annul Mine Seepage (Cub m/Year)
Year 1	Pre monsoon			
	Post monsoon			
Year 2	Pre monsoon			
	Post monsoon			
Year 3	Pre monsoon			
	Post monsoon			
Year 4	Pre monsoon			
	Post monsoon			
Year 5	Pre monsoon			
	Post monsoon			

Table 5.3 Total Mine seepage

Year	**Perion**	**Annul Mine Seepage (Cub m/Year)Table 5.1 + 5.2**
Year 1	Pre monsoon	
	Post monsoon	
Year 2	Pre monsoon	
	Post monsoon	
Year 3	Pre monsoon	
	Post monsoon	
Year 4	Pre monsoon	
	Post monsoon	
Year 5	Pre monsoon	
	Post monsoon	

- Hydraulic Conductivity should be based on Pumping Testing carried out by the Consultant and CGWB exploration data. The pumping test duration should be sufficiently large to capture hydrogeological boundaries/water bodies in adjacent areas.

- Hydraulic Gradient should be calculated based on the ground water slope at the Mining Pit Area

- Year wise and bench wise mine seepage calculation as per approved mine plan (up to conceptual period)

5.2 ESTIMATION OF RAINWATER QUANTUM DEWATERED

5.3 ADVANCED DEWATERING PLAN IN CASE OF COAL/LIGNITE MINES

The details of the advanced dewatering plan along with proposed location of the bore wells including other hydrogeological details may be provided.

5.4 GW MODELLING CHAPTER TO BE INCLUDED AS PER SOP GIVEN IN SECTION-D (IF APPLICABLE AS PER SECTION E & F)

Mining Projects with **seepage component more than 500 KLD** have to carry out GW Modelling studies and submit report (**Refer to Section E & F**). In case of discrepancies in the estimated seepage between Analytical (TIL) and Modelling studies, the higher values of the seepage shall be considered for grant of NOC.

6. MINE WATER MANAGEMENT

6.1 IMPACT OF MINE DEWATERING/ ABSTRACTION AND MITIGATION MEASURES

6.2 IMPACT ON THE GROUND WATER REGIME

This section will cover risks of the GW environmental degradation due to mining activities including likely impacts of proposed GW Withdrawal on surrounding area in nextfive years period, affected area and radius of influence.

6.3 IMPACT ON SURFACE WATER SOURCES

This section deals with impact of mine dewatering on the nearby surface water bodies including diversion of existing channels, constructed dam/ barrages/ weir/ canals/ hydro - electric projects if any, change in land use [change in flood plain, lotic & lentic systems etc.] and current & potential threats if any.

6.3 IMPACT ON WATER QUALITY

Impact of Mining on the GW and SW quality regime

6.4 MITIGATION MEASURES

Water conservation measures adopted/ proposed to be adopted to reduce/ reuse/save ground water need to be described here. Also measures for treatment of mine water and disposal of wastewater by mine may be furnished.

7 SALINE WATER DISPOSAL STRATEGIES (IN CASE OF SALINE WATER ABSTRACTION)

Brief details of technology and method to be adopted for disposal of reject/saline water and likely impact on surrounding water quality may be furnished in this section.

8. ANY OTHER DETAILS PERTAINING TO THE PROJECT.

9. SUMMARY AND CONCLUSION

This section must categorically include discussion on likely impact and mitigation measures.

10. BIBLIOGRAPHY

11. ACCREDITATION CERTIFICATE

C FORMAT FOR IMPACT ASSESSMENT REPORT FOR INFRASTRUCTURE PROJECTS INVOLVING DEWATERING

The **level of detail** required in the hydrogeological study is normally expected to be commensurate with the level of risk posed by the withdrawal of ground water by the industry/ infrastructure dewatering project, and level of uncertainty of the available information. In the report, the AC should provide clear rationale for the level of work performed and the methodology or study approach utilized. The consultant is expected to undertake field work to collect the requisite information from the field. If need be secondary data of Central/ State agencies may also be collected.

The AC should ensure that GW withdrawal may not cause irreversible impacts to the aquifer such as those that may occur if a confined aquifer is over-pumped. In addition, the withdrawal of ground water should not normally result in deterioration of quality of ground water on a neighbouring property. Even if the hydrogeological study demonstrates that there will not be any unacceptable impacts, the report must propose **contingency and mitigative measures** that will be implemented in the event of unforeseen unacceptable impacts.

Wherever feasible, the ministry encourages that water should be recycled and reused and should be **returned to its source** in order to conserve ground water resources. The study must also address the physical and water quality impacts to the natural environment that may result from a **discharge of the effluent on the Ground Water System**.

CHECK LIST FOR PP BEFORE SUBMISSION OF IAR/ CHR

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	Order has been attached.	
	Whether all sections as per report SoP have been covered (even if certain section is not deemed relevant, same should also be inserted in the text with comment like not required/ not applicable etc. with reason)	
7.	Whether Water Level maps have colour zoning as per SoP for report	
8.	Whether all figures in the report have been referred to/ discussed in text with Figure No.	
9.	Whether all tables in the report have been referred to/ discussed in text with Table No.	
10.	Whether all Maps have good resolution with Scale, Coordinates, North and Legend and whether legend is legible.	
11.	Whether source of data (in tables/ values etc.) taken from elsewhere (i.e Secondary Data) has been quoted in the text/ below the table.	
12.	Whether details of references cited in text/ source of data have been given at the end of report as Bibliography.	
13.	Whether all certificates/ documents bearing signatures (such as Work Order, Certificate by Consultant etc.) have the name of signatory below signature.	

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Signature with Name

1. SALIENT FEATURES OF THE PROPOSAL

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9.	District	
10.	Block/ Taluka	
11.	Category of Block/ Taluka (as per prevailing GWRE)	
12.	Quantum of GW applied (KLD)	
13.	Quantum of GW applied (m^3/Year)	
14.	Alluvium/ Non-alluvium	
15.	GW Modelling Required (Yes/ No)	
16.	Name of Authorized Signatory of Project & Designation	
17.	Consultant Details with Name of Authorized Signatory (If Institution)	
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19.	Accreditation Certificate No. and Date/ Validity	

	(In case jointly as per Point No. 14, No. and validity of both institution and individual are to be given)	

Signature with Name

2. ABOUT THE PROJECT

This section should identify and briefly describe the general location {Industrial belt, Block, District, State, coordinates} of the project, and intended use of the ground water withdrawal {Whether Existing or Proposed}, duration of study conducted and outline the scope of work performed. Project area and 5 Km radius/Square shall be demarcated on google map.

2.1 LANDUSE/ LAND COVER OF THE SURROUNDING AREA

This sub section will deal with the description and map of Landuse/ Land cover map of the area covering 5 km radius from the plant site.

2.2 DEM / TOPOGRAPHY

This subsection will deal with the topography of the surrounding area within 5 km radius from the plant site giving the details of elevation of the surrounding area. DEM and. or topographic contour map of the area within 5 km radius shall be given here.

2.3 GEOMORPHOLOGY AND DRAINAGE 5 KM (RADIUS/SQUARE)

This sub section will describe the geomorphology and drainage of the area and the text will be supported by Geomorphology and drainage maps.

2.4 DETAILS OF WETLANDS/ MAJOR WATER BODIES

This sub section will give the details of wetlands/ major water bodies if any within the 5 km radius and give information on distance/ direction of the plant site from the designated wetland.

If the project site is within 500 metres from the designated wetland as per Ramasar Convention (list of sites available on the NOCA P porta), detailed proposal to avoid/ mitigate the adverse impact on the wetland due to the ground water withdrawal shall be furnished.

HYDROGEOLOGY

3.1 GEOLOGICAL SETUP

This should include area specific geology and will contain information and maps of both regional Geology and the local Geology of the area within 5 km radius (Circle/ square) of the plant site. The maps should be based on GSI or field investigation data}.

3.2 HYDROGEOLOGICAL SETUP

The purpose of the GW survey is to collect baseline data that can help prevent and resolve interference complaints. The focus is on gathering current information about the existing hydrogeological conditions. Enhanced monitoring of wells may be performed where the focus would be on impacts that occur as a result of water withdrawal.

This section will deal with the ground water situation in and around the project area including water level and quality data and maps along with quality issues, if any. Hydrogeological map of the area covering 5 km radius from the plant site showing the aquifers available in the area and ground water table elevation contours and flow direction shall be given.

3.2.1. Aquifer characteristics

Information on type of aquifers, depth, thickness, porosity, permeability and storativity etc. shall be furnished in this sub section.

3.2.2. Ground water flow and aquifer interaction with surface water bodies

Information on ground water flow and details of ground water - surface water interconnection, if any, observed in the area shall be furnished.

3.2.3 Depth to water level

The consultants are supposed to measure water level in the study area, i.e. 5 KM radius/square in case of Industry/ infrastructure dewatering projects. Few wells can also be monitored outside the study area to extend the interpolations outside the study area. There should be at least 5-6 observation wells within the 5 Km radius study area and 3-4 outside the study area to be used for control points of water level & water table covering all directions. Water level data should not be collected during monsoon season (June - September).

This sub section shall give data on depth to ground water level (metres below ground level) collected from the field. Depth to water level map shall be prepared based on the data collected from the field. Depth to water level maps of pre-monsoon and post-monsoon seasons and also seasonal water level fluctuation map based on secondary data available shall also be incorporated in the report. These maps will also incorporate the primary data collected by the consultant, if the period of data collection coincides with the pre-monsoon/ post-monsoon. Season (pre-monsoon/ post-monsoon)/ month and year of data should be clearly mentioned on the maps.

3.2.4 Long term water level data analysis

This sub section will deal with the decadal water level trend analysis of both pre – monsoon and post – monsoon {based on State/CGWB data located within 5 km from project site and tapping same aquifer}. Hydrographs (line diagrams) of decadal water level data during pre-monsoon and post-monsoon seasons of a few select monitoring wells of Central/ State Government agencies showing the trend of water level variation should be given here.

3.2.5 Ground Water quality

This sub section will deal with the quality of ground water and shall include maps of electrical conductivity as contour and other Industry specific parameter as per the Annexures. Samples need to be collected by the consultant from the area covering 5 km radius of the plant site. No samples should be collected during monsoon season (June - September). Locations of samples may also be shown on the map. Samples should be analysed by NABL accredited laboratories only. The month and year of data collection may

be mentioned on the map. Minimum of 6-7 samples may be collected from the study area and 2 -3 samples from outside the study area.

3.2.6 Water quality of nearby water bodies

Water samples from the nearby water bodies, if any, present in the study area should be collected and analysed from NABL accredited laboratory. Data should be presented and discussed here.

4. DETAILS OF PROPOSED/ EXISTING TUBEWELLS/ BOREWELLS

This includes the table showing aquifer wise parameters, drilling depth, diameter, lithological log, details of pump lowered/ proposed to be lowered, H.P. of pump, well discharge (lps/Cub m/day) etc.

5. PROPOSED DEWATERING PLAN

5.1 PLAN FOR DEWATERING

This sub section will deal with the estimation of per day quantum of seepage that needs to be dewatered and clearly indicating the expected maximum depth from where dewatering will be done and specific period for which dewatering will be needed.

5.2 USAGE OF PUMPED WATER

This sub section will describe the proposed usage of pumped water for various uses like drinking, irrigation, recharge, runoff to the stream/ drain or any other use.

6. IMPACT ASSESSMENT

6.1 IMPACT ON THE GROUND WATER REGIME

This section will cover risks of the GW environmental degradation due to GW abstraction including likely impacts of proposed GW Withdrawal on surrounding area in next five years period, affected area and radius of influence.

6.2 IMPACT ON SURFACE WATER SOURCES

This section deals with impact of GW abstraction on the nearby surface water bodies & potential threats if any.

6.3 IMPACT ON WATER QUALITY

Impact of GW abstraction on the GW and SW quality regime.

6.4 MITIGATION MEASURES

Water conservation measures adopted/ proposed to be adopted to reduce/ reuse/save ground water need to be described here. Also measures for treatment of waste water and disposal of waste water by Industry may be furnished.

6.5 SALINE WATER DISPOSAL STRATEGIES (IN CASE OF SALINE WATER ABSTRACTION)

Brief details of technology and method to be adopted for disposal of reject/saline water and likely impact on surrounding water quality may be furnished in this section.

6.6 GW MODELLING (AS PER SECTION E & F)

7. SALINE WATER DISPOSAL STRATEGIES (IN CASE OF SALINE GW ABSTRACTION)

Brief details of technology and method to be adopted for disposal of reject/saline water and likely impact on surrounding water quality. Also measures adopted/ suggested to protect the ambient ground/ surface water resources against pollution should be mentioned here.

8. ANY OTHER DETAILS PERTAINING TO THE PROJECT

9. SUMMARY AND CONCLUSION

This chapter must categorically include discussion on likely impact and mitigation measures.

10. BIBLIOGRAPHY

Details of references cited and data sources are to be given.

11. ACCREDITATION CERTIFICATE

Accreditation Certificate may be attached in the report.

D SOP FOR MAPS AND CHARTS

Maps are important components of the above two reports. The SOP for maps is provided below for uniformity in presenting the information by the applicants across all the area. Maps should be full page on A3 size with good resolution and should not be inserted between the text. Reference of all figures /maps should be included in text. Scale should be shown in all the maps.

1. PROJECT AREA

All the maps for Impact Assessment Report shall be made in 5 KM radius/square in all cases and those for comprehensive hydrogeological report for mines shall be for core zone of 2 km radius and buffer zone of 10 Km radius from the project site.

2. BACKGROUND LAYERS

All the maps should have layer of background information which should include Localities, Project Location, Major drainage and transport network. Symbology of all back ground layers should be adopted as per symbology of Google Map.

3. HYDROGEOLOGICAL MAP

Hydrogeological maps should essentially have aquifer types, their potential and water table elevation (WTE) contours (meters above mean sea level). The maps should also depict GW flow directions perpendicular to WTE contours.

4. DEPTH TO WATER MAPS

The depth to water map for pre and post water level is to be prepared as part of the reports.

The consultants are supposed to measure water level in the study area, 5 KM radius/square in case of Industry and 10 KM radius/square in case of Mining projects. Few wells can also be measured outside the study area to extend the interpolations outside the study area. In case of industries, there should be at least 5-6 observation wells within the 5Km radius study area and 3-4 outside the study area to be used for control points of water level & water table covering all directions. In case of mining the nos. of monitoring wells should be 10 - 12 within the core and buffer zone and 4-5 outside the buffer zone.

It is suggested that the filled contours maps of the following intervals should be prepared having the following colour scheme.

Contour colour Shades

Depth to Water Range Below Ground Level (m)	Colour Shades	RGB
<2	Blue shades	
2-3	Blue shades	
3-5	Blue shades	
5-7	Green Shades	
7-10	Green Shades	
10-15	Yellow Shades	
15-20	Yellow Shades	

30-40	Brown Shades	
40-60	Brown Shades	
60-100	Red Shades	

In case the area is showing only one above defined range, the consultants can further refine the contour interval. Both the pre- and post-monsoon map should have same colour shade scheme.

5. WATER QUALITY MAPS

Water quality (WQ) maps in desired area of study should be provided in the report. Only EC & Chloride map should be presented as filled contours. Remaining parameter maps shall be presented as points marked with values on maps. The size of the points can be proportional to their concentration of the parameter observed in those locations.

Water Quality should be analysed in the study area, 5 KM radius/square in case of Industry and 10 KM radius/square in the Mining case. Samples may also be collected from a few wells located outside the study area to extend the interpolations outside the study area. In case of industries/ infrastructure dewatering projects, there should be at least 5-6 WQ observation wells within the 5Km radius study area and 3-4 outside the study area to be used for control points of water quality covering all directions. In case of mining the nos. of quality monitoring wells should be 10-12 within the buffer zone and 6-7 outside the buffer zone.

6. CHARTS

Hydrographs of the depth to water level need to be prepared for finding trend of depth to water levels with time. The hydrograph should be prepared based on the following method:

The hydrographs should be strictly XY line diagram with trend line and equation (Time Vs. Depth to Water Level). Secondary data of Central Ground Water Board or State Govt may be used for hydrographs and source should be properly mentioned.

Location of the hydrograph station(s) should be mentioned along with distance and direction from the unit.

7. INDICATIVE LIST OF FIGURES

All the reports should contain a list of figures after contents.

1. Location Map
2. Land use Map
3. DEM
4. Geomorphological map (including drainage and water bodies)
5. Geological map along with structural features
6. Hydrogeological map (Water table, aquifers, flow direction, yield) Pre & Post
7. Maps showing observation wells/ key wells
8. Depth to water map (mbgl) for Pre-monsoon and Post-monsoon

9. Water table (amsl) map with groundwater flow direction for Pre- and Post-monsoon
10. Water level fluctuation map
11. Hydrographs of selected observation wells
12. Water Quality Map (EC –Contour)
13. Water Quality Map (Chloride –Contour)
14. Water Quality Map (Nitrate- Point values)
15. Water Quality Map (Fluoride - Point values)
16. Graphical presentation of water quality

Note: Maps should include background layers as mentioned in Para D-2 above

E SOP FOR GROUND WATER MODELLING

GW Modelling studies are required to assess the impact of withdrawal on GW system on long term basin. Following are the criteria where modelling studies are required.

Industrial Projects

Assessment Unit Category	Modelling Method	Area Type	Quantum	Remarks
OCS	Analytical Modelling	HR/ Non-alluvium	>100-500	Refer to SECTION F
		Alluvium	>100-1000	
	Numerical Modelling	HR/ Non-alluvium	>500	
		Alluvium	>1000	
Safe	Numerical Modelling	HR/ Non-alluvium	>500	
		Alluvium	>2000	

Mining Projects

Numerical Modelling for all units with seepage component of dewatering above 500 KLD.

Infrastructure Projects

Numerical Modelling for all projects involving dewatering irrespective of quantum.

The chapter on the Modelling need to prepare based on the following lines:

1. BRIEF ABOUT THE MODEL AREA

This should include the basics of the area. Unnecessary information about the software used, its historical perspective, code etc need not be included in the chapter.

2. CONCEPTUAL MODEL

The conceptual model should include the following:

Parameter	Value
Grid	Nos of Column X Nos of Rows Size of Grid m x m , Nos of active grid and Nos of Inactive grid
Top of aquifer (m) range of elevation	
Bottom of aquifer (m) range of elevation	
Initial Piezometric Heads (m amsl)	Layer 1 Layer 2 Layer 3
Aquifer Type	Layer 1 : Layer 2 : Layer 3 :
Boundary Conditions Used	Constant Head Boundary: Constant Head boundary :

	No flow boundary GHB
K (m/ Day)	Layer 1 : Layer 2 : Layer 3 :
Specific yield (%)	Layer 1 : Layer 2 : Layer 3 :
Storage Parameters	Layer 1 : Layer 2 : Layer 3 :
Recharge applied	–mm/day
Draft applied	
Proposed Draft applied for the firm (NOC)	

Nos of additional layers if any and the Boundary conditions in the above table may be added as per the requirement and feasibility.

3. CALIBRATION AND VALIDATION

- **Model result-scenario generated for 5 to 10 year, water level map, water budget**
- **Observed and predicted contours shape matching**
- **Table of observed head and calculated head**
- **Mass Balance table and graph to be explained**

4. MODEL LIMITATION

Input parameters K & S used in comparison to observed field parameters.

Reason for using a specific type of Boundary conditions.

5. CONCLUSION AND RECOMMENDATION

RMS and normalised RMS error of the model

Prediction for next 10 years in staggered manner.

6. SUBMISSION OF SOFT COPY OF THE MODEL

All the consultants preparing GW Model are essentially to submit the model backup along with its basic files to CGWA for archival.

F GROUND WATER MODELLING METHODS FOR IMPACT ASSESSMENT

1. Introduction

Long-term withdrawal of groundwater from an aquifer can have a significant impact on the regional water table, which can lead to a range of environmental and economic consequences. The most significant impact of long-term groundwater withdrawal is the depletion of the water table, which can lead to a range of problems, including a decline in the availability of water for agriculture, industry, and domestic use. In some cases, the depletion of the water table can also result in land subsidence, which can cause structural damage to buildings, roads, and other infrastructure. Long-term groundwater withdrawal may also cause intrusion of saltwater into freshwater aquifers in hydraulic connection with the sea. Long-term groundwater withdrawal can also have ecological impacts due to reduction in flow of water to these systems can be reduced or cut off entirely, leading to reduction in stream flow, as well as deterioration of water quality and ecosystem health. This can have significant impacts on local wildlife and biodiversity. It can also have economic consequences due to the increase in the cost of water due to its reduced availability, making it more expensive for industries, farmers, and households to access the water they need. This can lead to economic hardship for some communities, particularly those in rural areas where agriculture is a significant source of income.

2. Impact Assessment Methods

Several methods are available to assess the impact of groundwater withdrawal. Some of the common methods suitable for assessing the impact of groundwater withdrawal are described below.

i Groundwater Monitoring

Groundwater monitoring involves the installation of monitoring wells to measure the depth of the water table and the rate of groundwater withdrawal. The data collected from the monitoring wells can be used to evaluate changes in the groundwater levels over time and assess the impact of groundwater withdrawal on the regional water table.

Stream flow Depletion Analysis:

Stream flow depletion analysis involves measuring the reduction in stream flow in response to groundwater withdrawal. This method is suitable for assessing the impact of groundwater withdrawal in areas where a stream flows in the vicinity of the pumping well, ideally within a distance of 1 to 1.5 km. The analysis involves measuring the reduction in stream flow caused by groundwater pumping and is suitable for assessing the impact of pumping on the environment in general and surface water resources and the environment. However, unless and until calibrated rainfall-runoff models are available to compute the runoff for the available rainfall, this method may result in unrealistic results. If the stream gauge stations give accurate runoff, then the depletion can be assessed accurately from the data.

ii Water Quality Analysis

Water quality analysis involves the measurement of various chemical and physical parameters of groundwater to determine the impact of groundwater withdrawal on water quality. The analysis can also help identify the presence of contaminants in the groundwater due to the impact of groundwater withdrawal.

iii Geophysical Surveys

Geophysical surveys involve the use of various geophysical techniques to map the subsurface structure of the aquifer and identify changes in the subsurface due to groundwater withdrawal. The surveys can help identify the extent of land subsidence and the potential for saltwater intrusion.

iv Remote Sensing

Remote sensing involves the use of satellite imagery and other remote sensing techniques to measure changes in land surface elevation, vegetation growth, and other environmental parameters. The data can be used to identify changes in the environment due to groundwater withdrawal.

v Groundwater Modelling

Groundwater modelling involves the use of mathematical equations to simulate the flow of groundwater in an aquifer. The model can be used to evaluate the impact of various factors such as groundwater withdrawal, recharge, and precipitation on the aquifer and the environment.

vi Predictive simulation of Ground Water levels

As a gradual decline in regional groundwater levels is almost always the prominent initial manifestation of the impact of groundwater withdrawal from the aquifer, prediction of groundwater levels at a future date is of importance for predicting the impact of pumping over a period of time. This is commonly done using the technique of groundwater modelling. Analytical and numerical models are two main types of modeling techniques used to predict the impact of groundwater withdrawal on regional water levels. While both models have their own advantages and limitations, there are several key differences between analytical and numerical models. Some of the major differences are mentioned below in brief:

a. **Analytical models use mathematical equations derived from fundamental principles of fluid mechanics to describe groundwater flow and transport. These equations are solved using mathematical techniques to obtain an exact solution. On the other hand, numerical models use numerical methods such as finite element, finite difference, and boundary element methods to solve the equations numerically, usually through computer programs.**

b. **Analytical models often make simplified assumptions about the geometry, boundary conditions and aquifer properties to obtain an exact solution. These assumptions may limit the applicability of the model to specific hydrogeological settings. Numerical models, however, can incorporate more complex geometry**

and boundary conditions, and can handle more complex aquifer properties, making them more versatile.

c. **Analytical models provide an exact solution to groundwater flow and transport problems, and are therefore highly accurate within their assumptions. Numerical models, on the other hand, rely on numerical approximations to solve the equations, and the accuracy of the results depends on the numerical methods used, the grid size and the time step used. Therefore, numerical models are generally less accurate than analytical models, but they can simulate more complex scenarios.**

d. **Numerical models are more flexible than analytical models, as they can be easily modified to incorporate new data or to simulate different scenarios. Analytical models, on the other hand, are less flexible and may require a complete re-derivation if significant changes are made.**

e. **Numerical models require significant computational resources to handle the large datasets and complex calculations involved. Analytical models, on the other hand, can be solved using hand calculations or simple computer programs, making them more accessible to those with limited computing resources.**

In general, analytical groundwater models are useful for solving simple problems or for getting quick estimates of groundwater flow, while numerical groundwater models are better suited for complex problems or for simulating the effects of management scenarios on the groundwater system.

3. Modelling Methods

As mentioned in the previous section, either analytical or numeric groundwater modelling techniques are useful for predicting long-term declines in groundwater levels in an area in response to groundwater withdrawal, depending on the complexity of the prevailing hydrogeological scenario. Ideal methods of analytical and numeric modelling suitable for different aquifers are described below in brief. **It may be mentioned that the values taken in examples are to explain the concepts/ formulae. Thus, the values are indicative and may deviate from actual values. Focus is mainly on the concepts/ formulae**.

3.i Analytical Modelling

Analytical modeling of transient flow conditions in confined, unconfined, and semi-confined aquifers can be challenging, and there are several analytical solutions that can be used for this purpose. Some well-known equations that could be ideally used for predicting the impact of groundwater withdrawals on regional groundwater levels through analytical modelling in different types of aquifers are as following.

a) Confined Aquifers:

The **Cooper-Jacob equation** is an analytical solution that can be used for estimating drawdown in a confined aquifer with a fully penetrating well.

Example:

The confined aquifer system has the following characteristics:

Aquifer thickness: 100 m; Hydraulic conductivity: 10 m/day; Specific storage: 0.0002; Transmissivity: 1000 m^2/day; Pumping rate: 200 m^3/day; Distance from the well to the observation well: 500 m; Time since start of pumping: 1 year.

To use the Cooper-Jacob method, two dimensionless parameters, viz. the Theis non-dimensional time (u) and the Theis non-dimensional distance need to be calculated first, using the following equations:

*u = S * T / t * r^2*
*r = (4 * T * t / S)^0.5 * r'*

where

'S' is the specific storage of the aquifer (m^-1), 'T' is the transmissivity of the aquifer (m^2/day), 't' is the time since pumping began (days) and 'r' ' is the distance from the pumping well to the observation well (m).

Using these equations, the value of r for the aquifer system is calculated as:

*r = (4 * 1000 * 365 / 0.0002)^0.5 * 500 = 28,081 m*

The value of u is then calculated as:

*u = 0.0002 * 1000 / (365 * 365) * 28,081^2 = 0.856*

Next, the Cooper-Jacob method is used to calculate the drawdown (s) at the observation well using the equation

*s = Q / (4 * pi * T) * W(u)*

where:

Q is the pumping rate (m^3/day), T is the transmissivity of the aquifer (m^2/day) and W(u) is the Cooper-Jacob well function, which is a function of the Theis non-dimensional time (u)

Using a table of well function values, we can find that W(u) = 0.290 for u = 0.856.

Replacing the values, we get:

*s = 200 / (4 * pi * 1000) * 0.290 = 0.018 m*

Therefore, the drawdown at the observation well after one year of pumping will be 0.018 meters.

The **Hantush-Jacob equation** is a modification of the Theis' solution that accounts for the delayed response of a confined aquifer with a partially penetrating well.

Example:

The confined aquifer system has the following characteristics:

Aquifer thickness: 50 m; Hydraulic conductivity: 25 m/day; Specific yield: 0.2; Storage coefficient: 0.0004; Transmissivity: 1250 m^2/day; Pumping rate: 300 m^3/day; Distance from the well to the observation well: 750 m; Time since pumping began: 2 years

To use the Hantush-Jacob method, the Hantush-Jacob dimensionless parameter (s) is calculated using the following equation:

$$s = 2 * rw * (T * t / S)^{0.5}$$

where:

rw is the radius of the pumping well (m), T is the transmissivity of the aquifer (m^2/day), t is the time since pumping began (days) and S is the storage coefficient of the aquifer (dimensionless)

Using these equations, we can calculate the value of s for our system:

$$s = 2 * 0.1 * (1250 * 2 / 0.0004)^{0.5} = 200$$

Next, the Hantush-Jacob method is used to calculate the drawdown (s) at the observation well using the equation:

$$s = Q / (4 * pi * T) * f(s)$$

where:

Q is the pumping rate (m^3/day), T is the transmissivity of the aquifer (m^2/day) and f(s) is the Hantush-Jacob well function, which is a function of the Hantush-Jacob dimensionless parameter (s)

Using a table of well function values, f(s) = 0.348 for s = 200.

Drawdown is then calculated by using the values mentioned above:

$$s = 300 / (4 * pi * 1250) * 0.348 = 0.018 \text{ m}$$

Therefore, the drawdown at the observation well after two years of pumping is 0.018 meters.

Note: the Hantush-Jacob method assumes steady-state flow conditions, which may not be appropriate for highly transient aquifer systems. In such cases, numerical modelling may be necessary to accurately predict changes in regional groundwater levels.

b) Unconfined Aquifers:

The **Theis equation** is the most commonly used analytical solution for predicting drawdown in an unconfined aquifer with a fully penetrating well.

Example:

The following values are assumed for the analysis

Pumping rate (Q) = 500 m3/day; Aquifer hydraulic conductivity (K) = 20 m/day; Aquifer thickness (b) = 30 m; Distance from the pumping well (r) = 800 m; Initial hydraulic head (Ho) = 40 m; Specific storage (Ss) = 0.0002

The drawdown (s) is calculated using Theis' equation:

*s = (Q / (4 * pi * K * Ss)) * W(u)*

where W(u) is the well function and u is a dimensionless parameter given by:

*u = r^2 * Ss / (4 * K * t), where t is the pumping time.*

For a pumping period of 1 year (365 days), the drawdown at a specific time is calculated using the following equation:

*s = (Q / (4 * pi * K * Ss)) * W(u) * exp(-r^2 * Ss / (4 * K * t))*

To find the well function value, the value of u is first calculated.

*u = r^2 * Ss / (4 * K * t)*

*= (800)^2 * 0.0002 / (4 * 20 * 365) = 0.03288*

Looking up the value of W(u) from the well function table, we find that for u = 0.03288, W(u) = 0.246.

Substituting these values into the equation for drawdown, we get:

*s = (500 / (4 * pi * 20 * 0.0002)) * 0.246 * exp(-(800)^2 * 0.0002 / (4 * 20 * 365))*

= 2.05 m

Therefore, the drawdown at a distance of 800 m from the pumping well after 1 year of pumping would be 2.05 m. This information can be used to predict changes in regional groundwater levels and manage groundwater resources accordingly.

The **Cooper-Jacob** equation can also be used for an unconfined aquifer, with the consideration of the unsaturated zone.

Example:

The following values are assumed for the analysis

Pumping rate (Q) = 1500 m3/day; Aquifer hydraulic conductivity (K) = 30 m/day; Aquifer thickness (b) = 25 m; Distance from the pumping well (r) = 600 m; Specific yield (Sy) = 0.15; Initial hydraulic head (Ho) = 45 m;

The Cooper-Jacob method involves calculating the dimensionless time, S, and the dimensionless distance, R, as follows:

*S = K * t / (b * Sy)*

*R = r * (Sy / (K * b))^0.5*

where t is the pumping time.

Using these dimensionless parameters, the drawdown (s) can be calculated using the following equation:

*s = (Q / (4 * pi * K * b * Sy)) * f(S, R)*

where f(S, R) is a dimensionless function that can be found in tables or calculated using numerical methods.

For a pumping period of 1 year (365 days), the drawdown at a specific time can be calculated using the following equation:

*s = (Q / (4 * pi * K * b * Sy)) * f(S, R) * exp(-S)*

To find the value of f(S, R), we need to first determine the values of S and R.

*S = K * t / (b * Sy) = 30 * 365 / (25 * 0.15) = 730*
*R = r * (Sy / (K * b))^0.5 = 600 * (0.15 / (30 * 25))^0.5 = 0.346*

Looking up the value of f(S, R) from the Cooper-Jacob table, we find that for S = 730 and R = 0.346, f(S, R) = 0.198.

Substituting these values into the equation for drawdown, we get:

*s = (1500 / (4 * pi * 30 * 25 * 0.15)) * 0.198 * exp(-730) = 4.07 m*

Therefore, the drawdown at a distance of 600 m from the pumping well after 1 year of pumping would be 4.07 m.

c) Semi-Confined Aquifers:

The **Walton model** is a semi-analytical solution that combines the Theis and Hantush equations to predict drawdown in a semi-confined aquifer with a fully penetrating well.

Example:

The following parameters are assumed:

Pumping rate (Q) = 2000 m3/day; Aquifer hydraulic conductivity (K) = 100 m/day; Aquifer thickness (b) = 20 m; Specific storage (Ss) = 5 x 10^-5 m^-1; Specific yield (Sy) = 0.2; Distance from the pumping well (r) = 500 m; Initial hydraulic head (Ho) = 40 m; Aquitard hydraulic conductivity (Kt) = 1 x 10^-5 m/day; Aquitard thickness (T) = 5 m

The Walton model involves calculating the dimensionless time, τ, and the dimensionless distance, ξ, as follows:

*τ = Ss * t / (Sy * b)*
*ξ = r / (4 * (Kt * T / K)^0.5)*

where t is the pumping time.

Using these dimensionless parameters, the drawdown (s) can be calculated using the following equation:

*s = (Q / (4 * pi * K * b)) * F(τ, ξ)*

where F(τ, ξ) is a dimensionless function that can be found in tables or calculated using numerical methods.

For a pumping period of 1 year (365 days), we can calculate the drawdown at a specific time using the following equation:

*s = (Q / (4 * pi * K * b)) * F(τ, ξ) * exp(-τ)*

To find the value of F(τ, ξ), we need to first determine the values of τ and ξ.

*τ = Ss * t / (Sy * b) = 5 x 10^-5 * 365 / (0.2 * 20) = 0.0453*

*ξ = r / (4 * (Kt * T / K)^0.5) = 500 / (4 * (1 x 10^-5 * 5 / 100)^0.5) = 100*

Looking up the value of F(τ, ξ) from the Walton table, we find that for τ = 0.0453 and ξ = 100, F(τ, ξ) = 0.103.

Substituting these values into the equation for drawdown, we get:

*s = (2000 / (4 * pi * 100 * 20)) * 0.103 * exp(-0.0453) = 2.52 m*

Therefore, the drawdown at a distance of 500 m from the pumping well after 1 year of pumping would be 2.52 m.

The **Hantush equation** is a purely analytical solution that can be used to estimate the drawdown in a semi-confined aquifer with a partially penetrating well.

Example

The following parameters are assumed:

Pumping rate (Q) = 1000 m3/day; Aquifer hydraulic conductivity (K) = 50 m/day; Aquifer thickness (b) = 25 m; Specific storage (Ss) = 2 x 10^-5 m^-1; Specific yield (Sy) = 0.15; Distance from the pumping well (r) = 400 m; Well radius (rw) = 0.15 m; Aquitard hydraulic conductivity (Kt) = 2 x 10^-6 m/day; Aquitard thickness (T) = 6 m

Using the Hantush equation, we first need to calculate the dimensionless time, ϑ, and the dimensionless distance, η:

*ϑ = (Ss / Sy) * t = (2 x 10^-5 / 0.15) * 365 = 0.8765*
*η = (r^2 * K * Ss / (4 * Kt * b * Sy))^0.5*
*= (400^2 * 50 * 2 x 10^-5 / (4 * 2 x 10^-6 * 25 * 0.15))^0.5 = 146.69*

Next, we need to find the value of the well function, w(u), using the table provided. The value of u can be calculated as follows:

*u = (η^2 * ϑ) / (T * r^2) = (146.69^2 * 0.8765) / (6 * 400^2) = 0.000518*

Using the table, we find that the corresponding value of w(u) is approximately 0.156.

Finally, we can calculate the drawdown (s) using the Hantush equation:

*s = (Q / (4 * pi * K * b * Sy)) * (1 / η) * w(u) * exp(-η^2 / (4 * ϑ))*
*= (1000 / (4 * pi * 50 * 25 * 0.15)) * (1 / 146.69) * 0.156 * exp(-146.69^2 / (4 * 0.8765)) = 1.47 m*

Therefore, the predicted drawdown at a distance of 400 m from the pumping well after one year of pumping is 1.47 m.

3.ii Numerical Modelling

There are several numerical models commonly used for predicting changes in regional groundwater levels in response to groundwater withdrawals, including:

a. **MODFLOW (MODular three-dimensional Finite-difference groundwater flow model): This is a widely used and highly customizable numerical model that can**

simulate groundwater flow in three dimensions under steady-state or transient conditions.

b. **FEFLOW (Finite Element subsurface FLOW system): This model is based on the finite element method and can simulate groundwater flow and transport in both two and three dimensions.**

c. **SEAWAT (SEAwater-intrusion and-density-dependent groundWATER flow): This is a coupled groundwater flow and solute transport model that can simulate saltwater intrusion and density-dependent flow in coastal aquifers.**

d. **MT3DMS (Multi-species Transport in 3-Dimensions Mass-Transport Model): This is a numerical model that can simulate the transport of multiple solutes in three dimensions, including their interaction with the groundwater flow field.**

e. **SUTRA (Saturated-Unsaturated Transport): This model is based on the finite element method and can simulate both saturated and unsaturated flow in porous media, including solute transport and heat transfer.**

These models vary in their complexity, capabilities, and required input data. The choice of model depends on the specific objectives of the study, available data, and the level of accuracy required for the predictions.

To use numerical models for predicting changes in regional groundwater levels in response to groundwater withdrawals, a number of steps must be followed:

a. **Data collection: Collect relevant data such as groundwater recharge rates, hydraulic conductivity, and pumping rates.**

b. **Model construction: Develop a numerical model using appropriate software such as MODFLOW, FEFLOW, or SEAWAT. This involves defining the aquifer properties, boundary conditions, and sources and sinks of groundwater.**

c. **Calibration: Calibrate the model by adjusting the input parameters to match the observed groundwater levels and flow rates.**

d. **Scenario development: Develop scenarios that reflect different pumping rates or changes in the aquifer properties over time.**

e. **Prediction: Run the numerical model for each scenario and analyze the predicted changes in groundwater levels and flow rates.**

f. **Validation: Validate the model predictions by comparing them with observed groundwater levels and flow rates.**

g. **Sensitivity analysis: Perform a sensitivity analysis to assess the impact of uncertainties in the input parameters on the model predictions.**

The choice of numerical model depends on the specific objectives of the study, available data, and the level of accuracy required for the predictions. The model should also be validated using observed data to ensure its reliability for making predictions.

Model Calibration

Calibration of outputs from modelling is essential for accurate prediction of changes in regional water levels in response to groundwater withdrawal. Calibration is the process of adjusting model parameters to match observed data, which allows the model to make more accurate predictions.

Groundwater models use mathematical equations to simulate the flow of water through an aquifer. These equations are based on physical laws and properties of the aquifer, such as hydraulic conductivity, porosity, and recharge rates. The accuracy of the model depends on the accuracy of these parameters.

However, in most cases, the exact values of these parameters are not known with certainty. Therefore, calibration is necessary to adjust these parameters based on observed data, such as water levels in monitoring wells. By comparing the model predictions with the observed data, the model parameters can be adjusted until the model output matches the observed data.

Calibration helps reduce uncertainty in the model predictions, and provides a more accurate representation of the aquifer system. It is important to note that calibration is an iterative process and requires an understanding of the aquifer system and the limitations of the model.

Procedure for calibration:

Through the process of analytical or numerical modelling, water levels are simulated within the specified time domain using the analytical solution depending on the aquifer type and using the available parameters. For calibration of the model, a fixed number of observation wells are idenified at varying distances from the pumping well within its cone of depression. The water levels in the observation wells are recorded at regular intervals. The water level / piezometric head in each well is then simulated for the same time periods using the analytical solution selected. The model can then be calibrated by adjusting the values of parameters such as T and S or Sy to get as close a match as possible to the measured water levels.

The reliability of the model outputs could be analyzed by calculating the the Root Mean Square (RMS) error and and the Normalized Root Mean Square (NRMS) error.

NRMS can be computed as a percentage by dividing RMS either by the mean of observed heads or Range of observed heads or standard deviation of observed heads.

For prediction of ground water levels in response to ground water withdrawal, an RMS error of up to 3.0m and NRMS error of up to 10% is considered acceptable. Even though it is considered mandatory to have both RMS and NRMS errors within the limits mentioned for treating the model as realistic, it is advisable to have at least one of these parameters within the prescribed limits in complex aquifer systems with limited data availability.

III ANNEXURES

Annexure-I: Water Quality Parameter Required for Various Types of Industries

DISCHARGING FACILITY	Gas and Oil	Dairy Products	Grain Mills	Canned Fruits & Vegetables	Canned & Preserved Sea Foods	Sugar Processing	Textiles	Cement	Feedlots	Electroplating	Organic Chemicals	Inorganic Chemicals	Plastics & Synthetics	Soap& Detergents	Fertiliser Manufacturing	Petroleum Refining	Iron & Steel Manufacturing	Non Ferrous	Phosphate Manufacturing	Steam Electric Power Generating
Waterqualityparameters																				
BiochemicalOxygen Demand,BOD	x	x	x	x	x	x	x		x		x	x	x	x	x	x				
TotalSuspendedSolids	x	x		x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
pH	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
FaecalColiforms	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Oil&Grease	x				x		x				x			x		x	x	x	x	x
Temperature	x	x	x	x	x	x	x	x	x		x	x	x	x		x	x	x	x	x
Chemical Oxygen Demand,COD						x	x				x	x	x	x		x		x		
Colour/Dye/Pigment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ElementalPhosphorus																			x	
TotalPhosphorus						x				x					x				x	x
Ammonia(asN)												x			x	x	x	x		
OrganicNitrogenasN						x									x					
Nitrate						x									x		x			
Flow	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Phenols							x				x		x			x	x			
Sulphide							x									x	x			
Total Chromium							x			x		x				x				
ChromiumVI										x		x				x				x
Chrome																				
Copper										x		x	x							x
Nickel										x		x								
Zinc										x			x				x			x
Zinc												x								
Cntotal										x		x								
CyanideA										x		x								
Fluorine										x		x	x					x	x	
Free Available Chlorine																				
Residual Chlorine	x																			x
Cadmium										x		x					x			
Lead										x		x					x	x		
Iron										x										
Tin										x		x								x
Silver										x										
Gold										x										
Iridium										x										
Palladium										x										
Rhodium										x										
Ruthenium										x										
Mercury(total)												x								
Total Organic Carbon												x					x			
Aluminium												x					x			
Arsenic												x					x		x	
Selenium												x								
Barium																				
Manganese																	x			
Tannin																				
Oil																				
Settleable Solids																				
Surfactants																				

Annexure-I (Contd.)

DISCHARGING FACILITY	Fero Alloy manufacturing	Leather tanning & finishing	Glass	Asbestos manufacturing	Rubber processing	Timber products	Pulp, Paper & paperboard	Builders paper & paper board mills	Meat products	Paving and roofing materials	Intensive chemical agriculture farm	Edible vegetable oils and fats	Hotels, Restaurants and Game Lodges	Bakeries & wheat confectioneries	Breweries (malt)	Soft drinks and carbonated waters
Waterqualityparameters																
BiochemicalOxygen Demand,BOD		x	x		x	x	x	x	x	x		x	x	x	x	x
TotalSuspendedSolids	x	x	x	x	x	x	x	x	x	x			x	x	x	x
pH	x	x	x	x	x	x	x	x	x	x	X	x	x	x	x	x
FaecalColiforms	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Oil&Grease		x			x	x	x	x	x	x		x	x			
Temperature	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x
Chemical Oxygen Demand,COD			x	x	x							x			x	x
Colour/Dye/Pigment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ElementalPhosphorus							x				x					
TotalPhosphorus			x								x		x			
Ammonia(asN)	x		x						x		x		x			
OrganicNitrogenasN											x		x			
Nitrate																
Flow	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Phenols	x		x			x										
Sulphide																
Total Chromium	x	x			x											
ChromiumVI	x															
Chrome		x														
Copper																
Nickel																
Zinc					x											
Zinc																
Cntotal	x															
CyanideA																
Fluorine			x		x											
Free Available Chlorine							x	x								
Residual Chlorine																
Cadmium																
Lead																
Iron			x													
Tin																
Silver																
Gold																
Iridium																
Palladium																
Rhodium																
Ruthenium																
Mercury(total)																
Total Organic Carbon																
Aluminium																
Arsenic																
Selenium																
Barium																
Manganese	x															
Tannin		x														
Oil		x														
Settleable Solids								x								
Surfactants											x	x				

Annexure-I (Contd.)

DISCHARGING FACILITY	Sugar confectionery	Tobacco processing	Distilling & blending of spirits	Motor-vehicle assembly	Paints, varnishes &	Batteries manufacture	Cosmetics	Printing, publishing &	Domestic sewage system	Pharmaceutical industries	Tea/ Coffee Industries	Slaughter Houses	Combined sewage
Waterqualityparameters													
BiochemicalOxygen Demand,BOD	x	x	x	x	x			x	x	x	x	x	x
TotalSuspendedSolids	x				x	x			x	x	x	x	x
pH	x	x	x	x	x	x	x	x	x	x	x	x	x
FaecalColiforms	x	x	x	x	x	x	x	x	x	x	x	x	x
Oil&Grease		x		x	x			x	x			x	x
Temperature	x	x	x	x	x	x	x	x				x	
Chemical Oxygen Demand,COD	x		x	x	x	x	x	x	x	x	x	x	x
Colour/Dye/Pigment	x	x	x	x	x	x	x	x	x	x	x	x	x
ElementalPhosphorus													
TotalPhosphorus	x								x			x	x
Ammonia(asN)					x				x			x	x
OrganicNitrogenasN	x										x	x	x
Nitrate													x
Flow	x	x	x	x	x	x	x	x	x	x	x	x	x
Phenols													x
Sulphide	x							x					x
Total Chromium					x								x
ChromiumVI													x
Chrome													
Copper													
Nickel													
Zinc													
Zinc													
Cntotal													
CyanideA													
Fluorine													
Free Available Chlorine													
Residual Chlorine													
Cadmium				x									
Lead				x									
Iron													
Tin													
Silver				x									
Gold													
Iridium													
Palladium													
Rhodium													
Ruthenium				x									
Mercury(total)													
Total Organic Carbon													
Aluminium													
Arsenic													
Selenium													
Barium													
Manganese													
Tannin													
Oil				x									
Settleable Solids													
Surfactants													